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Only 5110457

UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

PROJECT PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

5110457

APPENDIX TO:
BOLIVIA: Rural Access Roads

AID-DLC/P-2171 Appendix

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APPENDIX
TO
BOLIVIA: RURAL ACCESS ROADS LOAN

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CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, John R. Oleson, the principal officer of the Agency for International Development in Bolivia, having taken into account among other factors the maintenance and utilization of projects in Bolivia previously financed or assisted by the United States, do hereby certify that in my judgement Bolivia has both the financial capability and human resources capability to effectively maintain and utilize the capital assistance project: RURAL ACCESS ROADS I.

John R. Oleson

John R. Oleson
Director USAID/Bolivia

REPUBLICA DE BOLIVIA
MINISTERIO DE TRANSPORTES, COMUNICACIONES
Y AERONAUTICA CIVIL

Cite No. C-1-1200

AÑO DEL SESQUICENTENARIO DE LA REPUBLICA

La Paz, 22 de octubre de 1975

Señor
John R. Oleson
DIRECTOR DE USAID/BOLIVIA
Presente

Señor Director:

Ref: Solicitud de Asistencia Financiera Externa a AID para el Mejoramiento de Caminos de Acceso a Areas Rurales.

1. El Gobierno de Bolivia a través del Ministerio de Transportes, Comunicaciones y Aeronáutica Civil, ha desarrollado un programa que representa la primera fase de un esfuerzo de desarrollo sectorial cuya meta es principalmente el mejoramiento del sector de pequeños agricultores mediante la construcción de caminos vecinales que puedan ser utilizados durante todo el año.

Aunque el avaluo de las necesidades de desarrollo agrícola en Bolivia es preliminar, el mismo indica que debería darse alta prioridad al mejoramiento de los caminos de acceso a las parcelas de los agricultores pequeños en las áreas rurales del país.

Los propósitos del Proyecto son:

a) Creación de un departamento o división de "Caminos Vecinales" dentro del Servicio Nacional de Caminos dedicado a la construcción y mantenimiento de caminos de acceso rural, y

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b) Ayudar a los campesinos a aumentar el volúmen de venta de sus productos y consiguientemente sus ingresos, proveyendoles de mejores medios de comunicación con los mercados de consumo.

El Proyecto consistirá en el mejoramiento de 1000 a 1500 kms. de sendas o caminos de muy bajos standards de diseño en áreas seleccionadas de los departamentos de Cochabamba, Chuquisaca, La Paz y Santa Cruz.

Estos caminos, que servirán a las areas cultivadas por campesinos serán para tránsito permanente y concluídos con mínimos standards y conectarán areas de potencial agrícola a caminos existentes de la red caminera troncal y secundaria del país utilizables en todo tiempo.

El Proyecto será ejecutado por el Servicio Nacional de Caminos (SNC) con ayuda del Servicio Nacional de Desarrollo de la Comunidad (SNDC) y se empleará apreciable cantidad de mano de obra voluntaria prestada por las pequeñas comunidades agrícolas a ser beneficiadas por el proyecto.

Para el soporte de este programa el Gobierno de Bolivia está dispuesto a tomar las siguientes medidas:

2. Proveer fondos adicionales al presupuesto del Servicio Nacional de Caminos para el período comprendido entre 1976 y 1979 que sean necesarios para cubrir los siguientes gastos relacionados con el Proyecto.

a) Salarios para el personal profesional, superior y medio que sea necesario para realizar los estudios, preparar planos y supervisar la construcción.

b) Costo de carburantes, aceites, lubricantes y otros costos relativos al mantenimiento y operación del equipo necesario para completar exitosamente el proyecto.

c) Salarios para los operadores, choferes, y mecánicos que sean necesarios para operar el equipo adquirido con fondos del préstamo de AID propuesto.

3. Establecer, dentro del Servicio Nacional de Caminos, una División o Departamento de Caminos Vecinales, que deberá ser completamente responsable de la construcción y mantenimiento de los caminos de acceso a

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areas rurales, además de administrar el préstamo propuesto, esta repartición quedará como una organización permanente después de que el proyecto propuesto en ésta carta sea completado

4. El equipo adquirido para el Proyecto quedará en la repartición del Departamento o División de Caminos Vecinales del Servicio Nacional de Caminos después de la conclusión del Proyecto en la forma aquí descrita y será utilizado solamente en el futuro para el mantenimiento y construcción de caminos de acceso a areas rurales. Además es intención del Gobierno de Bolivia continuar con las actividades comprendidas en el Proyecto a fin de proveer caminos de acceso a areas del país que puedan beneficiarse con ellas. El ritmo al cual tales caminos puedan adicionalmente proveerse dependerá de los recursos internos y externos que puedan destinarse a este programa en los años que sigan al período del Proyecto.

El costo total del Proyecto que será llevado a cabo en un período de 4 años se estima en US$ 17.900.000 de los cuales el Gobierno de Bolivia está en posibilidad de aportar US$ 3.400.000 sin incluír el costo de los agregados para la superficie de rodadura (que se estima tendrá un valor de US$.--- 800.000) que podrán ser provistos de las canteras del Servicio Nacional de Caminos. Se espera que las comunidades locales beneficiadas contribuirán aproximadamente con US$ 5.200.000 en servicios y materiales para completar los sub-proyectos. En Consecuencia, el Gobierno de Bolivia, solicita un préstamo de US$ 8.500.000 que será amortizado en cuarenta años incluyendo un perído de gracia de 10 años con un interés anual del 2% durante el período de gracia y 3% después de dicho período.

Con este motivo, saludamos al señor Director con nuestra mayor atención,

Cnl. DAEM Víctor Castillo Suárez
MINISTRO DE FINANZAS

My. DIM (r) Julio Trigo Ramírez
MINISTRO DE TRANSPORTES, COMUNICACIONES Y AERONAUTICA CIVIL

REPUBLIC OF BOLIVIA
MINISTRY OF TRANSPORTS, COMMUNICATIONS
AND CIVIL AERONAUTICS

La Paz, October 22, 1975

FREE TRANSLATION

Mr. John R. Oleson
Director
USAID/Bolivia
La Paz

Mr. Director:

Subject: Request for External Financial Assistance from AID for Construction of Rural Access Roads

1. The Government of Bolivia through the Ministry of Transportation has developed a program which represents the first phase of a sectorial development effort whose focus principally affects the betterment of the small farm sector through the construction of all-weather farm-to-market roads. While the Governments' assessment of the agricultural development needs of Bolivia is preliminary, it indicates that a high priority should be given to the improvement of access roads affecting small farmers in the rural areas of Bolivia.

The purpose of the program are:

a) Development of a "Caminos Vecinales" department or division within the Servicio Nacional de Caminos, dedicated to the construction and maintenance of rural access roads, and

b) To assist the campesinos in increasing their off-farm sales resulting in increased income, through providing better access to markets.

The Project will consist of the improvement of between 1,000 km. and 1,500 kms. of existing trails or unimproved roads in selected rural areas in the Departments of Cochabamba, Chuquisaca, La Paz and Santa Cruz.

These roads will be all-weather and constructed to minimum standards, and will connect areas of agricultural potential to the existing all-weather road system in Bolivia.

The Project will be executed by the Servicio Nacional de Caminos (SNC) with the assistance of the Servicio Nacional de Desarrollo de la Comunidad (SNDC). It will employee large amounts of voluntary

labor by the small farm communities to be benefited by the Project.

In order to support this program, the Government of Bolivia is prepared to take the following measures:

2. Provide funds in the budget of the Servicio Nacional de Caminos over the period 1976 through 1979 necessary to cover the following expenses related to the Project.

a) Salaries of the professional and sub-professional personnel necessary to prepare studies, and plans and to supervise construction.

b) Cost of fuel, oil, lubricants and other related costs of equipment maintenance and operation necessary for the successful completion of the Project.

c) Cost of operators, drivers and mechanics necessary to operate the equipment to be acquired with funds from the proposed AID loan.

3. Establish, within the Servicio Nacional de Caminos, a division or department de Caminos Vecinales, which will be fully responsible for the construction and maintenance of rural access roads. In addition to administering the proposed loan, this division will remain as a permanent organization after the Project proposed herein is completed.

4. The equipment procured for the Project will remain in the Caminos Vecinales division or department of the SNC after completion of the Project described herein, and will continue to be utilized only for the maintenance and construction of rural access roads. In addition, it is the intent of the Government of Bolivia to continue the activities undertaken in the Project so as to provide rural access roads to areas of the community which would benefit from them. The rate at which such additional roads will be provided will depend on the domestic and external resources which can be allocated to this Project in the year following the Project period.

The total cost of the Project, which will be carried out over a four year period is estimated at approximately US$ 17,900,000 of which the Government of Bolivia is in a position to provide $3,400,000 not including aggregate surfacing, (estimated to have

a value of $ 800,000) which can be provided from existing SNC crushing plants. Local benefited communities are expected to contribute approximate US$ 5,200,000 in services and materials to complete the sub-projects. Consequently, the Government of Bolivia requests a loan of US$ 8,500,000 which will be amortized over forty years including a grace period of ten years with an annual interest of 2% during the grace period and an interest of 3% thereafter.

Sincerely yours,

(signed) DAEM Victor Castillo Suarez
MINISTER OF FINANCE

(signed) DIM (r) Julio Trigo Ramirez
MINISTER OF TRANSPORTS,
COMMUNICATIONS AND CIVIL
AERONAUTICS

CHECKLIST OF STATUTORY CRITERIA

In the right-hand margin, for each item, write answer or, as appropriate, a summary of required discussion. As necessary, reference the section(s) of the Capital Assistance Paper, or other clearly identified and available document, in which the matter is further discussed. This form may be made a part of the Capital Assistance Paper.

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended.

FAA, 1973 - Foreign Assistance Act of 1973.

App. - Foreign Assistance and Related Programs Appropriation Act, 1974.

MMA - Merchant Marine Act of 1936, as amended.

BASIC AUTHORITY

1. FAA § 103; § 104; § 105; § 106; § 107. Is loan being made

a. for agriculture, rural development or nutrition;	The loan is made for agriculture although it has transportation implications.
b. for population planning or health;	
c. for education, public administration, or human resources development;	

d. to solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development;

e. in support of the general economy of the recipient country or for development programs conducted by private or international organizations.

COUNTRY PERFORMANCE

Progress Towards Country Goals

2. FAA § 201 (b) (5), (7) & (8); § 208

A. Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.	Bolivia is making appropriate efforts with respect to food production, storage, and distribution. AID Loans 511-L-042, 511-T-050, 511-T-052, 511-T-053 and this loan will contribute to these efforts.
(2) Creating a favorable climate for foreign and domestic private enterprise and investment.	The GOB program emphasized creation of a favorable climate for selected foreign and domestic private enterprise and investments It is seeking special exemptions within the Andean Common Market for certain investments.
(3) Increasing the public's role in the developmental process.	The GOB continues to take an active role in the developmental process and in so doing to increase popular participation.

(4) (a) Allocating available budgetary resources to development.	The GOB appears to be allocating as much as it is able to development.
(b) Diverting such resources for unnecessary military expenditure (See also Item No. 20) and intervention in affairs of other free and independent nations.) (See also Item No. 11).	The GOB is not intervening in the affairs of other free and independent nations.
(5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.	The GOB is making these efforts.
(6) Willing to contribute funds to the project or program.	The GOB is willing to contribute funds to the Project (see Financial Analysis of PP).
(7) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.	The GOB appears to be doing this in an increasingly effective manner.
B. Are above factors taken into account in the furnishing of the subject assistance?	Yes.

Treatment of U.S. Citizens and Firms.

3. FAA § 620 (c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?	The GOB is not known to be indebted under these circumstances to any U. S. citizen for goods or services furnished or ordered.
4. FAA § 620 (e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?	The previous government of Bolivia nationalized two United States mining firms. However, the GOB is now adequately compensating the former owners.
5. FAA § 620 (o); Fishermen's Protective Act. § 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters,	Not applicable.
a. has any deduction required by Fishermen's Protective Act been made?	

b. has complete denial of assistance been considered by A.I.D. Administrator?

Relations with U.S. Government and Other Nations

6. FAA § 620 (a). Does recipient country furnish assistance to Cuba?	The GOB does not furnish assistance to Cuba.
7. FAA § 620 (b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?	Bolivia is not controlled by the international communist movement according to the Secretary of State.
8. FAA § 620 (d). If assistance is for any productive enterprise which will compete in the United States with United States enterprise, is there an agreement by the recipient country to prevent export to the United States of more than 20% of the enterprise's annual production during the life of the loan?	Not applicable.
9. FAA § 620 (f). Is recipient country a Communist country?	No. Bolivia is not a Communist country.

10. FAA § 620 (i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	No. Bolivia is not engaged in these activities.
11. FAA § 620 (j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?	The GOB has taken adequate measures to prevent the damage or destruction by mob action of U.S. property whenever possible.
12. FAA § 620 (l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, in convertibility or confiscation, has the A.I.D. administration within the past year considered denying assistance to such government for this reason?	The GOB has instituted the investment guarantee program.
13. FAA § 620 (n). Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam?	No. The GOB does not furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam.
14. FAA § 620 (q). Is the government of the recipient country in default on interest or principal of any A.I.D. loan to the country?	As of May 6, 1976 the GOB is not in default on interest or principal of any A.I.D. loan.

15. FAA § 620 (t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?	No. The GOB has not severed diplomatic relations with the United States.
16. FAA § 620 (u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the A.I.D. Administrator in determining the current A.I.D. Operational Year Budget?	Bolivia is in arrears but not to such an extent as to disenfranchise it in the General Assembly. The administrator did take the arrearages into account in determining the OYB.
17. FAA § 481. Has the government of recipient country failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?	The GOB is actively cooperating with USAID Narcotics Officers and DEA representatives as well as other international agencies to take such steps as may be necessary to control drug traffic in Bolivia.
18. FAA, 1973 § 29. If (a) military base is located in recipient country, and was constructed or is being maintained or operated with funds furnished by U.S., and (b) U.S. personnel carry out military operations from such base, has the President determined that the government of recipient country has authorized regular access to U.S. correspondents to such base?	Not applicable.

Military Expenditures

19. FAA s 620 (s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).)	The CY 1975 Budget for Military purposes represents approximately 19.4% of total budgeted expenditures of the GOB. Approximately $1.3 million has been budgeted for the purchase of non-sophisticated military equipment.

Conditions of The Loan

General Soundness

20. FAA s 201 (d). Information and conclusion on reasonableness and legality (under laws of country and the United States) of lending and relending terms of the loan.	The loan terms are reasonable and consistent with United States and Bolivian laws and do not involve relending.
21. FAA s 201 (b) (2); s 201 (e) Information and conclusion on on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to A.I.D. an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?	The GOB has made an application for loan funded assistance in this activity (See Annex I, Exhibit 2) and there have been assurances that the funds will be used in an economically and technically sound manner.
22. FAA s 201 (b) (2). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.	There are reasonable prospects of repayments.

23. FAA s 201 (b) (1). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States.	Financing for this activity is not available from other free-world sources, including private sources within the United States, on reasonable terms.
24. FAA s 611 (a) (1). Prior to signing of loan will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the United States of the assistance?	Preliminary engineering, financial, and other plans necessary to carry out the assistance have been prepared (see Engineering and Financial Analysis Sections). Detailed engineering to be financed by the loan remains to be done. Reasonably firm estimates have been established.
25. FAA s 611 (a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of loan?	No.
26. FAA s 611 (e). If loan is for Capital Assistance, and all U.S. assistance to project now exceeds $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	Yes. The Mission Director has so certified

Loan's Relationship to Achievement of Country and Regional Goals

27. FAA s 207; s 113 Extent to which assistance reflects appropriate emphasis on; (a) encouraging development of democratic, economic, political, and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs;	This loan will contribute directly to the objectives reflected in items (a), (b), (c), (e) and (f) (see Section II. A.).

(e) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (f) integrating women into the recipient country's national economy.

28. FAA § 209. Is project susceptible of execution as part of regional project? If so why is project not so executed?

This project could not be carried out as part of a regional project since it is designed to promote the development of an area wholly within Bolivia. (See IIB, Project Description of the PP)

29. FAA § 201 (b) (4). Information and conclusion on activity's relationship to, and consistency with, other development activities, and its contribution to realizable long-range objectives.

This activity has broad significance with regard to the long range objectives of integrating the rural areas into the national economic, social, and political life and of strengthening the economy.

30. FAA § 201 (b) (9). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.

This project will contribute toward the achievement of self-sustaining growth.

31. FAA § 209. Information and conclusion whether assistance will encourage regional development programs.

By strengthening the economic base of small farmers in the project area, La Paz, Cochambamba, Chuquisaca, and Santa Cruz, the capacity of Bolivia to participate in regional activities should be enhanced.

32. FAA s 111. Discuss the extent to which the loan will strengthen the participation of urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.

The loan will directly strengthen the participation of the rural poor in Bolivia's development by enhancing their capability to contribute to the national economy by expanding their agricultural production. Priority attention will be directed at small farmers thus enabling and encouraging greater numbers of rural poor to help themselves (see Project Description of PP).

33. FAA s 201 (f). If this is a project loan, describe how such project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development.

The project loan will promote Bolivia's economic development by increasing the country's off-farm sales of agricultural products. This will be accomplished by, inter alia, constructing roads to link production areas to markets, training of equipment operators and providing the mechanism whereby residents of the Project area can more efficiently use their human and material resources so that they can more fully contribute to the goal of increased production and ultimately to the process of economic development.

34. FAA s 281 (a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions.

This loan will make a significant contribution to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private and local governmental institutions such as community level construction, supervision and maintenance committees (see Project Description of PP).

35. FAA s 281 (b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

The program directly contributes to all three of these areas by (a) providing training to the rural poor in the project area and (b) training members of rural small farmer communities so they can become more effective participants in both commercial and governmental activities.

36. FAA § 201 (b) (3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities?	The activity gives reasonable promise of contributing to the increase of productive capacity in agriculture by providing access roads linking small farmers with rural markets in the project area.
37. FAA § 601 (a). Information and conclusions whether loan will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	This loan should affect all of the items with the exception of (f).
38. FAA § 619. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?	Not applicable.

Loan's Effect on U.S. and A.I.D. Program

39. FAA § 201 (b) (6). Information and conclusion on possible effects of loan on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities	The loan will have no foreseeable unfavorable effect on the United States economy. U. S. products and technical assistance will be imported (See Financial Section of PP).

and assistance are furnished in a manner consistent with improving the U.S. balance of payments position.

40. FAA § 202 (a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.	Not applicable.
41. FAA § 601 (b). Information and conclusion on how the loan will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	There will be U. S. private sector participation in this project to the extent that loan proceeds will be used to buy materials from U.S. sources (see Financial Section of PP).
42. FAA § 601 (d). If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest?	Professional advisory services of U.S. firms will be utilized to the maximum extent consistent with the needs of the Project.

43. FAA § 602. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and service financed by the loan.	U.S. small business will be invited to participate when appropriate.
44. FAA § 620 (h). Will the loan promote or assist the foreign aid projects or activities of the Communist-Bloc countries?	No. The Loan will not promote or assist the foreign aid projects or activities of the Communist-Bloc countries.
45. FAA § 621. If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs.	Limited technical assistance and consulting services will most likely be provided by private sector groups.

Loan's Compliance with Specific Requirements

46. FAA § 110 (a); § 208 (e). In what manner has or will the recipient country provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the Loan is to be made?	The GOB's loan request provides assurances that it will provide at least 25% of the costs of the project for which the loan is to be made (see Project Description and Financial Analysis Sections of PP).

47. FAA § 112. Will loan be used to finance police training or related program in recipient country?	No.
48. FAA §§ 114. Will loan be used to pay for performance of abortions or to motivate or coerce persons to practice abortions?	No.
49. FAA § 201 (b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year?	Yes.
50. FAA § 201 (d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter?	Yes.
51. FAA § 201 (f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise?	To assure appropriate participation, Bolivian private sector will be given the opportunity to bid for the provision of goods and services necessary in the construction and maintenance of the rural roads.
52. FAA § 604 (a). Will all commodity procurement financed under the loan be from the United States except as otherwise determined by the President?	Yes. Code 941 and Bolivian sources will be used for procurement.

53. FAA § 604 (b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price?	Not applicable.
54. FAA § 604 (d). If the cooperating country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the United States on commodities financed by the loan?	In the unlikely event that Bolivia discriminates against any U.S. marine insurance company, commodities purchased with loan funds will be insured against risks with a U.S. company.
55. FAA § 604 (e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	Not applicable.
56. FAA § 604 (f). If loan finances a commodity import program, will arrangements be made for supplier certification to A.I.D. and A.I.D. approval of commodity as eligible and suitable?	Not applicable.
57. FAA § 608 (a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.	The Mission will ensure that the Borrower is appraised of the availability of excess U.S. Government property and that the Borrower purchases that property which fits its needs.

58. FAA s 611 (b); App. s 101. If loan finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962?	Not applicable.
59. FAA s 611 (c). If contracts for construction are to be financed what provision will be made that they be let on a competitive basis to maximum extent practicable?	This requirement will be met by adherence to A.I.D. and Bolivian regulations concerning procurement of contractor services.
60. FAA s 612 (h); s 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the United States are utilized to meet the cost of contractual and other services	No Bolivian pesos owned by the U.S. are available for financing this project. An effort was made during intensive review to ensure that Bolivian sources contributed local currency to the maximum extent possible.
61. App. s 113. Will any of loan funds be used to acquire currency of recipient country from non-U.S. Treasury sources when excess currency of that country is on deposit in U.S. Treasury?	No.
62. FAA s 612 (d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release?	The U.S. does not own excess foreign currency in Bolivia.

63. FAA s 620 (g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property?	Assistance will not be used to compensate owners for expropriated or nationalized property.
64. FAA s 620 (k). If construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed $100 million?	Not applicable.
65. FAA s 636 (i). Will any loan funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States or any guaranty of such transaction?	No. Any motor vehicles needed will be imported from the United States unless other procurement is authorized.
66. App. s 103. Will any loan funds be used to pay pensions, etc., for military personnel?	No. Loan funds will not be used to pay pensions for military personnel.
67. App. s 105. If loan is for capital project, is there provision for A.I.D. approval of all contractors and contract terms?	Yes.
68. App. s 107. Will any loan funds be used to pay UN assessments?	No.

69. App. s 108. Compliance with regulations on employment of U.S. and local personnel. (A.I.D. Regulation 7).	Will comply.
70. App. s 110. Will any of loan funds be used to carry out provisions of FAA s s 209 (d)?	No.
71. App s. 114. Describe how the Committee on Appropriations of the Senate and House have been or will be notified concerning the activity, program, project, country, or other operation to be financed by the Loan.	Since this loan is a "shelf" loan, appropriate steps will be taken to properly notify the Congress upon decision to authorize it.
72. App. s 601. Will any loan funds be used for publicity or propaganda purposes within the United States not authorized by Congress?	No. Loan funds will not be used for publicity purposes within the U.S.
73. MMA s 901. b; FAA s 640 C.	These regulations will be complied with
(a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed with funds made available under this loan shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	
(b) Will grant be made to loan recipient to pay all or any portion of such differential as may exist between U.S. and foreign-flag vessel rates?	No.

74. Section 30 and 31 of PL 93-189 (FAA of 1973). Will any part of the loan be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, North Vietnam, South Vietnam, or Thailand? — No.

75. Section 37 of PL 93-189 (FAA of 1973); App. s. 111. Will any part of this loan be used to aid or assist generally or in the reconstruction of North Vietnam? — No.

76. App. s 112. Will any of the funds appropriated or local currencies generated as a result of AID assistance be used for support of police or prison construction and administration in South Vietnam or for support of police training of South Vietnamese? — No.

77. App. s 604. Will any of the funds appropriated for this project be used to furnish petroleum fuels produced in the continental United States to Southeast Asia for use by non-U.S. nationals? — No.

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E.O. 11652: N/A

SUBJECT: RURAL ACCESS ROADS IRR

THE DAEC REVIEWED SUBJECT IRR ON JANUARY 31 AND AUTHORIZED INTENSIVE REVIEW OF THE PROJECT SUBJECT TO THE CONDITIONS AND COMMENTS OUTLINED BELOW:

1. INSTITUTIONAL CAPACITY

A. THE SNC'S ABILITY TO EFFECTIVELY ADMINISTER THE PROPOSED PROJECT SHOULD BE ANALUZED IN DETAIL. THIS REVIEW SHOULD CONSIDER THE FOLLOWING: 1) EXISTING MANAGEMENT CAPACITY AND A DISCUSSION OF PLANS (OTHER THAN THE A.I.D. LOAN) FOR EXPANDING AND IMPROVING THIS CAPACITY: 2) THE MANPOWER RESOURCES OF THE SNC INCLUDING NUMBERS OF PERSONNEL, SKILLS, EXPERIENCE IN RELATION TO INCREASED DEMAND REQUIRED BY THE PROPOSED PROJECT: 3) STAFFING REQUIREMENTS OF THE PROPOSED RURAL ROADS DIVISION OF THE SNC AT BOTH THE CENTRAL AND REGIONAL LEVELS. (THE CLASS OF ROADS TO BE CONSTRUCTED AND THE LABOR/CAPITAL MIX WILL DICTATE THE PERSONNEL REQUIREMENTS FOR ANY SPECIFIC REGION, BUT A REASONABLE ATTEMPT SHOULD BE MADE IN DESCRIBING STAFFING DEMAND AND PATTERNS AT THE REGIONAL LEVEL): 4) PRIOR EXPERIENCE WITH VARYING LABOR/CAPITAL MIX AND: 5) APPLICABILITY OF PRIOR EXPERIENCE WITH HIGHWAY CONSTRUCTION TECHNIQUES TO ACCESS ROADS CONSTRUCTION. (A DISCUSSION OF PREVIOUS MANPOWER TRAINING FINANCED BY A.I.D., INCLUDING EQUIPMENT OPERATORS, THROUGH HIGHWAY CONSTRUCTION LOANS TO BOLIVIA SHOULD BE INCLUDED.) THE USAID SHOULD RELATE THE PROPOSED ACTIVITIES TO PRIOR A.I.D.- SNC EXPERIENCE IN ROAD CONSTRUCTION AND EVALUATE SNC PERFORMANCE IN TERMS OF MEETING PRIOR COMMITMENTS.

B. FUTURE PLANS FOR SNC INVOLVEMENT IN RURAL ACCESS ROADS CONSTRUCTION SHOULD BE DISCUSSED. ADMINISTRATIVE, OPERATIONAL, AND MAINTENANCE CAPACITY REQUIRED BY THE SNC TO CONTINUE A PROGRAM OF ACCESS ROADS (THROUGH THE RURAL ROADS DIVISION) AFTER TERMINATION OF THIS PROJECT

SHOULD BE ADDRESSED. A COMMITMENT SHOULD BE ELICITED FROM THE GOB TO ASSURE THE CONTINUATION OF THE PROGRAM ASSURANCE SHOULD ALSO BE OBTAINED THAT EQUIPMENT PROCURED FOR THE CONSTRUCTION OF ACCESS ROADS IS NOT LATER DIVERTED TO HIGHWAY CONSTRUCTION.

C. THE ROLE OF THE NCDS IN EXECUTING THIS PROJECT SHOULD BE CAREFULLY CONSIDERED. SUCH AN APPRAISAL WOULD INCLUDE THE CONSIDERATIONS DISCUSSED IN THE CABLE ON THE DAEC REVIEW OF THE SMALL FARMER ORGANIZATIONS IRR AS WELL AS: 1) NCDS EXPERIENCE IN ORGANIZING VOLUNTEER LABOR FOR CONSTRUCTION PROJECTS: 2) STAFF REQUIREMENTS AND/OR STAFF INCREASES NEEDED TO ADMINISTER VOLUNTARY LABOR COMPONENT OF THIS PROJECT: 3) BURDEN PLACED ON NCDS INSTITUTIONAL CAPACITY TO ADMINISTER THIS AMONG SEVERAL OTHER PROJECTS: AND 4) NCDS' ABILITY TO CONTINUE COMMUNITY/ORGANIZATIONAL SUPPORT TO THE SNC IN LIGHT OF OTHER OBLIGATIONS.

2. SUB-PROJECT ANALYSIS & SELECTION

A. THE PRELIMINARY LIST OF ROADS WHICH ARE PROPOSED FOR SUB-PROJECT FUNDING SHOULD BE IDENTIFIED IN THE CAP. THE METHOD AND BASIS FOR INITIAL SELECTION OF EACH REGIONAL SUB-PROJECT SHOULD BE DISCUSSED IN DETAIL. THE PROJECT'S FINANCIAL PLAN, HOWEVER, MAY INCLUDE SOME ELEMENT OF FLEXIBILITY TO ALLOW HIGH PRIORITY ACCESS ROADS IDENTIFIED SUBSEQUENT TO CAP PREPARATION TO BE INCLUDED IN THE PROGRAM, AND TO PERMIT SUBSTITUTION OF SUCH SUB-PROJECTS FOR THOSE FOUND NOT TO MEET ELIGIBILITY CRITERIA AFTER FURTHER ANALYSIS.

B. THE CAP SHOULD DESCRIBE THE ANALYTICAL FRAMEWORK TO BE UTILIZED FOR FINAL PROJECT SELECTION, INCLUDING A DISCUSSION OF: (A) THE PROCEDURE THROUGH WHICH SUB-PROJECT REQUESTS OR PROPOSALS ARE ORIGINATED: (B) THE METHODOLOGY TO BE UTILIZED TO ANALYZE SUB-PROJECT BENEFITS (INCLUDING ANY WEIGHTING SYSTEM TO BE EMPLOYED): (C) THE SOCIO-ECONOMIC CRITERIA FOR FINAL SELECTION OF A SUB-PROJECT FOR FINANCING (IN THIS REGARD, THERE IS A PRESUMPTION THAT THE MINIMUM RATE OF RETURN FOR ELIGIBLE SUB-PROJECTS WOULD EQUAL THE ESTIMATED OPPORTUNITY COST OF CAPITAL IN BOLIVIA: (D) IDENTIFICATION OF THE GOB ORGANIZATIONAL UNITS ASSIGNED RESPONSIBILITY FOR (I) CONDUCTING THE ECONOMIC FEASIBILITY ANALYSIS: (II) DESIGN WORK AND TEHNICAL ANALYSIS: AND (III) APPROVING SUB-PROJECTS FOR FINANCING: AND (E) THE ROLES TO BE PLAYED BY THE SNC, NCDS AND AGRICULTURAL PLANNING AUTHORITIES IN THE PROJECT SELECTION PROCESS.

THE CRITERIA FOR SELECTION WHICH ARE ADOPTED SHOULD TAKE INTO ACCOUNT THE EXPRESSION OF COMMUNITY NEEDS: ASSURE THAT THE TARGET GROUP IS THE PRIMER BENEFICIARY OF APPROVED SUB-PROJECTS; AND THAT POLITICAL CONSIDERATIONS AT THE LOCAL OR NATIONAL LEVEL DO NOT ADVERSELY INFLUENCE SUB-PROJECT SELECTION (IN THE DEVELOPMENT OF THE METHODOLOGY FOR SUB-PROJECT BENEFIT ANALYSIS, SUGGEST MISSION UTILIZE SERVICES OF TRANSPORTATION ECONOMIST EXPERIENCED IN THIS TYPE OF PROJECT. PLEASE ADVISE IF AID/W ASSITANCE DESIRED IN THIS RESPECT (E.G. DEMETRE OR TRANSPORTATION CONSULTANT.)

WITH RESPECT TO THE LABOR/CAPITAL MIX IN THE ROAD CONSTRUCTION THE CAPT SHOULD SET FORTH THE METHOD BY WHICH THE PROPOSED MIX IS ESTABLISHED, INCLUDING A DISCUSSION OF THE NATURE OF THE TRADE-OFFS WHICH WOULD BE INVOLVED IN INCREASING THE LABOR COMPONENT BEYOND THE LEVEL WHICH THE MISSION CONSIDERS OPTIMAL.

C. THE CAP SHOULD DISCUSS HOW THE RELATIVE IMPORTANCE OF OTHER CONSTRAINTS TO INCREASED AGRICULTURAL PRODUCTION IN SUB-PROJECT AREAS WILL BE ANALYZED TO DETERMINE WHAT OTHER FACTORS, IF ANY, MAY NEED TO BE ADDRESSED IN ORDER TO ASSURE THAT THE PROJECTED PROJECT BENEFITS WILL BE FORTHCOMING. THIS ANALYSIS SHOULD INCLUDE A DISCUSSION OF: 1) THE SIGNIFICANCE OF RURAL ACCESS ROADS IN REDUCING AGRICULTURAL MARKETING CONSTRAINTS; 2) GOB PRICE POLICY (E.G. TOLL ROADS) AND THE IMPACT OF THIS POLICY ON THE POTENTIAL BENEFITS OF THIS PROJECT AND 3) THE AMOUNT OF POTENTIAL SURPLUC WHICH COULD BE MARKETED AS A RESULT OF REMOVAL OF CONTRAINTS. AS MAY BE APPROPRIATE, THE MISSION SHOULD CONSIDER OBTAINING COVENANTS CONCERNING GOB MARKETING AND OTHER POLICIES WHICH MAY DIRECTLY AFFECT CONSTRAINTS.

3. COMMUNITY CONTRIBUTION

A. THE CAP SHOULD ADDRESS THE COMMUNITY LABOR CONTRIBUTION TO CONSTRUCTION ACTIVITIES. THIS ANALYSIS SHOULD INCLUDE A DISCUSSION OF 1) THE METHOD FOR TAKING INTO ACCOUNT COMMUNITY ENTHUSIASM (OR LACK THEREOF) INTO THE SELECTION PROCEDURE; 2) POTENTIAL PROBLEMS ARISING FROM THE LOSS OF COMMUNITY INTEREST BETWEEN THE TIME OF PROPOSAL INITIATION AND ACTUAL PROJECT CONSTRUCTION AND; 3) THE AVAILABILITY OF COMMUNITY LABOR FOR EACH OF THE SUB - PROJECTS.

B. CAP SHOULD DISCUSS THE POTENTIAL DIFFICULTIES IN AND FEASIBILITY OF RECRUITING VOLUNTARY LABOR. THE MISSION SHOULD INVESTIGATE THE POSSIBLE MOTIVATIONAL ADVANTAGES OF PAYMENT FOR COMMUNITY LABOR.

C. CAP SHOULD ALSO DISCUSS THE FEASIBILITY OF THE COMMUNITY MAINTENANCE SCHEME AND ADDRESS THE FOLLOWING: 1) COMMUNITY COMMITMENT TO ROAD MAINTENANCE; SNC'S ABILITY AND/OR DESIRE TO AID THE COMMUNITY IN UNDERTAKING MAJOR ROAD MAINTENANCE; 3) PROBLEMS OF COORDINATION BETWEEN COMMUNITY ROAD MAINTENANCE SUPERVISOR AND THE SNC; 4) THE SYSTEM THROUGH WHICH THE COMMUNITY WILL APPEAL TO THE SNC FOR AIDING IN THE RESOLUTION OF MAJOR MAINTENANCE PROBLEMS, AND 5) CONTINGENCY PLANS FOR ASSURING ADEQUATE MAINTENANCE BY THE SNC SHOULD COMMUNITY MAINTENANCE BE DEMONSTRATED TO BE INOPERATIVE (OVERTIME OR AS A RESULT OF THE INTENSIVE REVIEW ANALYSIS).

4. COSTS AND TECHNICAL ANALYSIS

A. THE MISSION SHOULD UNDERTAKE AN EXAMINATION OF THE UTILITY OF PAVING VS. ALL WEATHER SURFACING OF ROADS; OR PORTIONS THEREOF, TAKING INTO ACCOUNT SOIL, AND CLIMATE CONDITIONS, GRADES AND MAINTENANCE REQUIREMENTS.

THIS ANALYSIS SHOULD ALSO INCLUDE A DISCUSSION OF: 1) THE ADVANTAGES AND DISADVANTAGES OF EACH BOTH TO THE NATIONAL HIGHWAY SYSTEM AND TO THE REGION; 2) THE RELATIVE COST OF THE ALTERNATIVES AND THE IMPACT ON ESTIMATED PROJECT COSTS.

B. THE MISSION SHOULD ANALYZE THE COST OF ROAD CONSTRUCTION SUPERVISION, MATERIALS, AND EQUIPMENT PER KILOMETER. FROM THIS ANALYSIS THE MISSION SHOULD BE ABLE TO DETERMINE THE KILOMETERS OF ROAD TO BE BUILT FOR ESTIMATED PROJECT COST AND THE MIX OF LABOR AND CAPITAL TO BE USED IN ROAD CONSTRUCTION.

5. OVERALL STRATEGY

A. THE MISSION SHOULD DISCUSS COMPLEMENTARITY OF ACCESS ROADS PROGRAM TO OTHER A.I.D. PROGRAMS IN BOLIVIA (E.G., RURAL EDUCATION) AND TO OTHER DONOR PROGRAMS. DEVELOPMENT OF THE CRITERIA FOR INITIAL SUB-PROJECT SELECTION SHOULD PROVIDE REFERENCE TO SUB-PROJECTS COMPLEMENTARY TO OTHER A.I.D. PROGRAMS IN THESE SELECTED AREAS.

B. MISSION SHOULD DISCUSS THE EXTENT TO WHICH THIS PROGRAM IS PART OF AN OVERALL BOLIVIAN TRANSPORTATION STRATEGY WHICH A.I.D. CAN SUPPORT. A DISCUSSION OF THE INITIAL ROAD SELECTION SHOULD DEMONSTRATE THE EXTENT TO WHICH THESE ACCESS ROADS COMPLEMENT BOLIVIAN TRANSPORTATION ACTIVITIES.

6. DISBURSEMENT PROCEDURES

A. THE MISSION SHOULD DISCUSS THE EFFECTS OF A THREE-YEAR DISBURSEMENT PERIOD ON THE CAPITAL/LABOR MIX CHOSEN AND ANTICIPATED LEAD TIME FOR PROCURING EQUIPMENT. THERE IS A PRESUMPTION IN FAVOR OF A THREE-YEAR DISBURSEMENT PERIOD. HOWEVER, DELAYS IN PROCUREMENT MAY WARRANT A LONGER PERIOD. CAP SHOULD THEREFORE LAY OUT ALTERNATIVE STRATEGIES FOR DISBURSEMENT PERIODS WHICH EXTEND UP TO FIVE YEARS.

B. MISSION SHOULD INCLUDE IN THE CAP THE MECHANISM FOR DISBURSEMENT AND A DISCUSSION OF THE RATIONALE FOR SELECTING THIS MECHANISM. THE REASONS FOR CONSIDERING THE FIXED AMOUNT REIMBURSEMENT SYSTEM INAPPROPRIATE FOR THIS PROJECT SHOULD BE ARTICULATED IN THE CAP.

7. SUPERVISION AND MONITORING

THE CAP SHOULD ADDRESS THE QUESTION OF PROVIDING ADEQUATE MISSION MONITORING OF SUB-PROJECTS. THE DEMANDS ON MISSION PERSONNEL SHOULD BE ADDRESSED IN RELATION TO: (1) THE IMPORTANCE OF ASSURING THAT ACCEPTABLE ECONOMIS ANALYSES ARE PERFORMED FOR

THE SUB-PROJECTS: (2) ASSURING THAT ENGINEERING DESIGN AND EXECUTION ARE PROPERLY CARRIED OUT AND: (3) THAT THE TASK OF MONITORING DISBURSEMENTS AND SUB-PROJECT PROGRESS IS CARRIED OUT. INGERSOLL

E.O. 11652: SECSTATE 1415/75

SUBJECT: RURAL ACCESS ROADS PP - DAEC REVIEW

1. AS A RESULT OF NOVEMBER 20 DAEC REVIEW OF SUBJECT PROJECT, CERTAIN AREAS OF ADDITIONAL INFORMATION AND ANALYSIS WERE IDENTIFIED AS NECESSARY TO DEMONSTRATE ECONOMIC SOUNDNESS. THIS ADDITIONAL WORK IS DESCRIBED IN PARA 2-4 BELOW. BUREAU RECOMMENDATIONS ON APPROVAL OF THE PROJECT WILL DEPEND UPON DETERMINATION THAT THESE ISSUES SATISFACTORILY ADDRESSED.

2. SUB-PROJECT SELECTION CRITERIA: PP SHOULD BE REVISED TO REFLECT UNDERSTANDING WITH GOB THAT IN SELECTING ROADS FOR FINANCING (FROM AMONG ROADS FOUND ELIGIBLE) GOB WILL GIVE POSITIVE WEIGHT TO THOSE ROADS WHICH WOULD SERVE PORTIONS OF TARGET GROUP WHOSE INCOME IS AS LOW ON THE INCOME SPECTRUM AS POSSIBLE (WHILE STILL MEETING BASIC ECONOMIC VIABILITY TEST). INFORMATION TO ENABLE GOB TO IMPLEMENT THAT UNDERSTANDING WOULD BE COLLECTED DURING ECONOMIC FEASIBILITY STUDY FOR EACH ROAD.

PP SHOULD ALSO REFLECT UNDERSTANDING WITH GOB RE CRITERIA AND METHODOLOGY WHICH GOB WILL APPLY IN SELECTING ROADS FOR PRIORITY ATTENTION FROM AMONG THOSE ELIGIBLE FOR FINANCING.

3. TARGET GROUP: THE PP SHOULD PROVIDE ADDITIONAL DESCRIPTIVE SOCIO ECONOMIC CHARACTERISTICS OF THOSE FARM FAMILIES WHO WILL BE GENERATING THE ESTIMATED 3.1 MILLION INCREMENTAL PRODUCTION PER ANNUM, (AVERAGING 206.00 DOLLARS), AS CONSTRASTED WITH THE SOCIO ECONOMIC CHARACTERISTICS (LEVELS OF PRODUCTION, ASSETS, ETC.) OF THE TARGET GROUP AS A WHOLE. MISSION SHOULD ALSO ADD TO PP MATERIAL MORE FULLY EXPLAINING THE ASSUMPTIONS AND ANALYTICAL PROCESS LYING BEHIND INCOME BENEFITS PROJECTED TO RESULT FROM THE PROJECT.

4. CHOICE OF TECHNOLOGY AND ECONOMIC SOUNDNESS: ANALYSIS IN SUPPORT OF PROPOSED LABOR/CAPITAL CONSTRUCTION TECHNOLOGY NEEDS TO BE REVISED AND AMPLIFIED. REVISED ANALYSIS SHOULD DEMONSTRATE OPTIMAL LABOR/CAPITAL MIX IN TERMS OF FACTOR ENDOWMENTS AND PRICES, AGGREGATE INCOME EFFECTS ON TARGET GROUP AND EFFICIENCY IN ACHIEVING PROJECT PURPOSE.

AS TO APPROACH, THE MISSION SHOULD FIRST EXAMINE THE AVAILABILITY OF UNSKILLED LABOR FOR WORK ON THE ROADS. THAT ANALYSIS SHOULD BE TAILORED TO FULLY CONSIDER AND TEST (1) THE SEASONALITY AND OFF-FARM AVAILABILITY (2) THE LEVEL OF UNDER EMPLOYMENT AND UNEMPLOYMENT IN THE RURAL SECTOR (3) THE POSSIBLE FOREGONE PRODUCTION IN AGRICULTURE GIVEN THE COINCIDENCE OF TIMING OF INTENSE FARM ACTIVITIES TO ROAD

CONSTRUCTION AND THE VALUE OF PAID CONSTRUCTION LABOR COMPARED TO FOREGONE PRODUCTION AND (4) THE SKILLED LABOR PREMIUMS WITHIN THE RURAL SECTOR. THE OUTCOME SHOULD PROVIDE THE BASIS FOR THE SHADOW PRICE CALCULATIONS FOR THE UNSKILLED LABOR AS WELL AS THE PREMIUM FOR SKILLED LABOR.

WITH REGARD TO THE ROAD CONSTRUCTION TECHNIQUE, ALTERNATIVES SHOULD BE DEVELOPED TO COMPARE VARIOUS LABOR CAPITAL RATIOS. TO THAT END, THE FOLLOWING COMPARATIVE ANALYSIS SHOULD BE CONDUCTED: (1) DEVELOP A TRADITIONAL MACHINE-INTENSIVE ROAD CONSTRUCTION UNIT, BY ACTIVITIES (I.E. MOBILIZATION, CLEAR & GRUP: EARTHWORK ETC.) TO IDENTIFY SPECIFIC MACHINE AND LABOR CATEGORIES, (2) SUBSTITUTE HAND LABOR FOR SPECIFIC EQUIPMENT PIECES, FROM TWO POINTS OF VIEW, (A) THE SPECIFIC ACTIVITY (B) THE CONSTRUCTION UNIT AS A WHOLE.

UPON COMPLETION, THE RESULTS SHOULD FORM THE BASIS OF PROTO-TYPE LABOR INTENSIVE AND CAPITAL INTENSIVE CONFIGURATIONS FOR FURTHER USE IN THE COMPARATIVE ANALYSIS. AT THAT JUNCTURE, THE LABOR INTENSIVE PROTO-TYPE SHOULD BE UTILIZED TO DETERMINE THE MAXIMUM LABOR INPUT WITH A MINIMUM REDUCTION OF PRODUCTIVITY, WHILE HOLDING THE 17.8 MILLION PROGRAM LEVEL CONSTANT AND KEEPING THE LABOR COMPONENT REALISTIC RELATIVE TO SUPPLY THEREOF.

RESULTS FROM ABOVE ANALYSIS SHOULD THEN BE COSTED BOTH FROM A FINANCIAL (I.E., MARKET PRICES) AND ECONOMIC (I.E., ACCOUNTING PRICES) POINT OF VIEW. THE BASES FOR THE RESPECTIVE INPUT PRICES, AND OTHER ECONOMIC SHADOW ADJUSTMENTS (SUCH AS CEMENT, STEEL & ECT) WHOULD BE EXPLAINED.

SUBSEQUENTLY, THE VARIOUS MIX OF ALTERNATIVES AND THEIR RELATED INCREMENTAL INCOME EFFECTS, SHOULD BE TESTED IN THE BENEFIT-COST ANALYSIS. THE COMPARATIVE OUTCOME WOULD BE USED FOR MEASURING THE FINAL ECONOMIC WORTHINESS OF EACH ALTERNATIVE.

OTHER RELEVANT INPUTS SUCH AS THE SOCIOLOGICAL, CULTURAL AND GOB POLICY CONSIDERATIONS THAT AFFECT THE CHOICE OF TECHNOLOGY SHOULD BE OVERLAID ON THE ECONOMIC ANALYSIS TO JUSTIFY THE OPTIMAL LABOR/CAPITAL MIX.

IN ORDER TO ASSIST THE MISSION WITH THIS ANALYSIS, AID/W WILL SUPPLY THE TDY SERVICES OF A TRANSPORTATION ECONOMIST LATE FEBRUARY AND WILL, BY SEPARATE CABLE INFORM THE MISSION OF ANY INFORMATION WHICH THE MISSION SHOULD GATHER BEFORE ARRIVAL OF THE ECONOMIST, IN ORDER TO FACILITATE HIS WORK. FURTHER, DEMETRE WILL PREPARE ILLUSTRATIVE ANALYSIS OF CONSTRUCTED ALTERNATIVES AND PUCH TO MISSION ASAP.

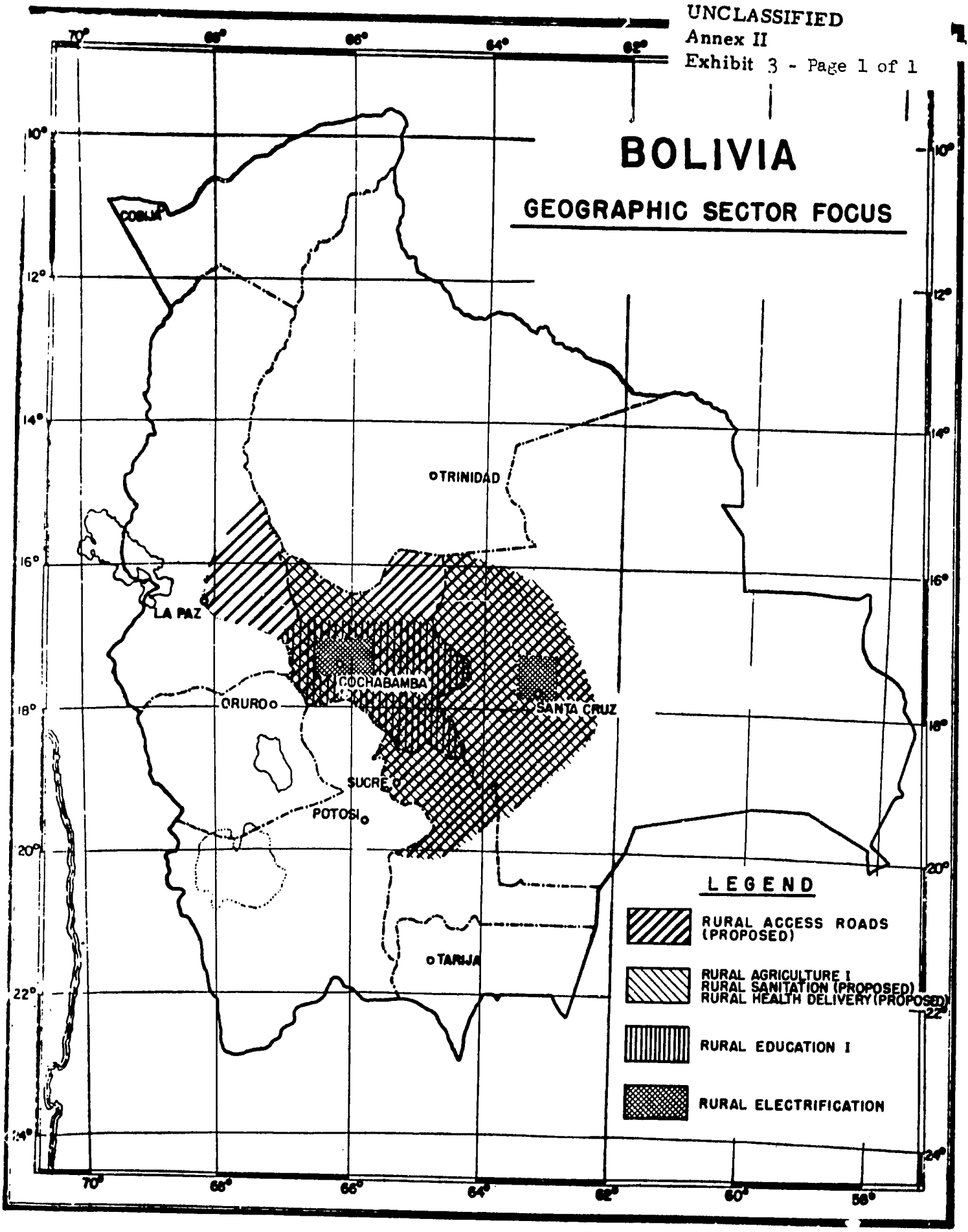
RURAL ACCESS ROADS PRP WAS ALSO REVIEWED BY DAEC ON NOVEMBER 20, AND APPROVED FOR INTENSIVE REVIEW. SEPTEL CONTAINING INTENSIVE REVIEW GUIDANCE FOLLOWS ASAP.

RESPONSE TO DAEC CABLE ON PROJECT PAPER

PARAGRAPH 2. SUBPROJECT SELECTION CRITERIA HAVE BEEN RE-DESIGNED TO GIVE POSITIVE WEIGHT TO POOREST FARMERS, AND FARMERS WITH THE LEAST LAND, OTHER FACTORS RECEIVING POSITIVE WEIGHT ARE THE BENEFIT COST RATIO AND SUBPROJECTS REACHING THE LARGEST NUMBER OF FARMERS (SEE SECTION II.B.6)

PARAGRAPH 3. THE TARGET GROUP ANALYSIS HAS BEEN REFINED TO SHOW INCOME DISTRIBUTION PATTERNS BY TARGET REGION (SEE SECTION II.B.4.b). SOCIO ECONOMIC CHARACTERISTICS OF THE TARGET GROUP ARE INCLUDED IN SECTION III.B.1. THE ASSUMPTIONS AND ANALYTICAL PROCEDURES UNDERLYING INCOME BENEFIT PROJECTIONS ARE INCLUDED IN SECTION III.C.2

PARAGRAPH 4. THE CHOICE OF TECHNOLOGY ANALYSIS INCLUDING AN ANALYSIS OF ALTERNNATE TECHNOLOGIES IS CONTAINED IN SECTION III.A.1. THE AVAILABILITY OF UNSKILLED LABOR IS DISCUSSED IN SECTION III.A.1.b. THE FOREGONE AGRICULTURAL PRODUCTION OF UNSKILLED LABOR, AND THE OPPORTUNITY COST OF LABOR ARE DISCUSSED IN SECTION III.C.2. THE COST/BENEFIT ANALYSIS OF ALTERNATIVE TECHNOLOGIES IS INCLUDED IN ANNEX IV EXHIBIT 4.


BOLIVIA
GEOGRAPHIC SECTOR FOCUS
COBIJA
TRINIDAD
LA PAZ
COCHABAMBA
ORURO
SANTA CRUZ
SUCRE
POTOSI
TARIJA
LEGEND
RURAL ACCESS ROADS (PROPOSED)
RURAL AGRICULTURE I
RURAL SANITATION (PROPOSED)
RURAL HEALTH DELIVERY (PROPOSED)
RURAL EDUCATION I
RURAL ELECTRIFICATION
70°
68°
66°
64°
62°
60°
58°
10°
12°
14°
16°
18°
20°
22°
24°

RURAL ACCESS ROADS PROJECT

PRELIMINARY LIST OF CANDIDATE ROADS FOR SUB-PROJECT FUNDING

Location	Kms.	Road Type[2]	Length requiring improvmt.	Total small farms served	Small[a] farms/ Kms.	Connects with all-weather roads Yes/No	Distance to markets Kms.	Distance to Agric.Ext. Service Office	Importance
SANTA CRUZ DEPARTMENT									
Palizada-Pulquina	43	ES	43	380	9	Yes	Comarapa(40) Santa Cruz (219) Cochab.(306)	Comarapa(40)	Vegetables, grapes, potatoes, fruits (porcino,caprino)
Hierba Buena-Toco-San Antonio	7	S	7	130	19	Yes	Mairana(43) Santa Cruz (163)	Mairana(43)	Tobacco,corn, dairy cattle
Samaipata-San Juan del Rosario-Siringalito	27	S	27	250	10	Yes	Samaipata(14) Santa Cruz (134)	Samaipata(14)	Fruits,corn, potatoes, dairy cattle (porcino)
Hierba Buena-Postrer Valle	44	ES	44	300	10	Yes	Santa Cruz (160) Mairana(30) Cochab.(200)	Mairana(30)	Tobacco, tomatoes, corn,fruits, dairy cattle (caprino)

Location	Kms.	Road Type[2]	Length requiring improvmt.	Total small farms served	Small[a] farms/ Km.	Connects with all-weather roads Yes/No	Distance to markets Kms.	Distance to Agric. Ext. Service Offic.	Importance
La Tuna-San Isioma-Mendiola	15	S	15	80	6	Yes	Sta.Cruz(136) Mairana(37) Cochab.(368)	Mairana (37)	Corn, potatoes, tobacco, wheat, dairy cattle, (caprino)
Buen Retiro-Colonia-Antofagasta	16	ES	16	1000	76	Yes	Sta.Cruz(155) Cochab.(655) LaPaz(1058)	Colonia Antofagasta(8)	main productive area of rice, corn, yuca, wood.
Buen Retiro-San Carlos	13	ES	13	200	15	Yes	Sta.Cruz(145) Cochab.(1645) LaPaz(1047)	Buena Vista(19)	Rice, corn, yuca, wood, dairy cattle.
Buena Vista-Colonia Huaytú	22	ES	22	500	25	Yes	Sta.Cruz(111) Cochab.(611) LaPaz(1017)	Buena Vista(11)	Rice, fruits, corn, yuca.
LA PAZ DEPARTMENT									
Chicaloma-Pariguaya	20	CH	20	60	4	Yes	Chulumani(25) LaPaz(145)	Chulumani(25)	Fruits
Irupana-Lejna y Llojeta	13	ES	10	60	5	Yes	Irupana(20) LaPaz(151)	Chulumani(51)	Forestry, fruits.
Lavi-Irupana(Centro de Formación de Líderes)	5	ES	5	--	--	Yes	Irupana(20) LaPaz (151)	Chulumani-Lavi(51)	Road improvement for agricultural education purposes
Huancané-Sanani-Apaapa	10	CH	10	200	20	Yes	Chulumani(12)	Chulumani(12)	Forestry, coffee, veget., fruits with seeds.

Location	Kms.	Road Type[2]	Length requiring improvmt.	Total small farms served	Small[a] farms/ Km.	Connects with all-weather roads Yes/No	Distance to markets Kms.	Distance to Agric. Ext. Service Office	Importance
Carmen Pampa-San Pedro de la Loma	5	FS	5	30	6	Yes	Coroico(10) La Paz(126)	Coroico(10)	Join agricultural extension services with coffee co-ops.
Chovacollo-San Juan de la Miel	8	ES	8	45	6	Yes	Coroico(14) La Paz(98)	Coroico(14)	Join these communities with a main road through Yolosa: coffee, citrus.
San Pedro-Coroico Viejo	3	FS	3	60	20	Yes	Coroico(4) La Paz(95)	Coroico(4)	High productive zone
Teoponte-Tamachi-Mayaya -Sararía	58	ES&CH	58	400	7	Yes	Caranavi(63) La Paz(227)	Caranavi(63)	
Suapi-Quilo Quilo-Loho	60	FS&CH	60	400	7	Yes	Coroico(24) La Paz(120)	Coroico(24)	Coffee
Taipiplaya-Ingavi-Primera-Achiri-Yara	30	CH	30	350	12	Yes	Caranavi(20) La Paz(64)	Caranavi(20)	Coffee,plantains, rice, corn,yuca.
Villa Elevación-Fernandez-Carrasco	30	ES	30	410	27	Yes	Caranavi(20)	Caranavi(20)	Rice,corn,coffee, plantains, yuca, citrus, wood.
Taipiplaya-Villa Victoria-CruzPlaya	30	CH	30	120	4	Yes	Caranavi(20) La Paz(164)	Caranavi(20)	Rice, corn, coffee,plantains, yuca, citrus, wood.

Location	Kms.	Road Type[2]	Length requiring improvmt.	Total small farms served	Small[a] farms Km.	Connects with all-weather roads Yes/No	Distance to markets Kms.	Distance to Agric.Ext. Serv.Office	Importance
Tajliwi-Villa Elevación	18	CH	18	250	14	Yes	Caranavi(10) La Paz(184)	Caranavi(10)	Rice. corn, coffee,plantains, yuca, citrus, wood.
COCHABAMBA DEPARTMENT									
Alalay-La Paccha-Tintin	60	S	50	340	7	Yes	Punata(47) Arani(45) Cochab.(93)	Mizque(45)	wheat, corn, barley, potatoes, dairy cattle, sheep, goat,pork.
Tacachi-Kekona	20	S	20	110	6	Yes	Punata(30) Cochab.(84)	Punata(32) Arani(30)	Wheat, corn, barley, potatoes, dairy cattle, sheep, goat,pork.
Aguirre-Tiraque	15	ES	15	300	20	Yes	Sacaba(24) Cochab.(38)	Sacaba(24) Arani(20)	Wheat, potatoes, barley, dairy cattle, sheep.
Cañadas-Sacambilla	15	S	15	130	9	Yes	Cochab.(61)	Punata(13) Arani(13)	Potatoes, wheat, barley, sheep, pork.
Tarata-Izata	25	ES	20	400	20	Yes	Tarata(12) Cochab.(45)	Tarata(12)	Wheat
Anzaldo-Caine	20	ES	20	120	6	Only part of the road,North of Potosi	Anzaldo(10) Cliza(22) Tarata(32)	Tarata (32) Anzaldo(10)	wheat, potatoes, barley, sheep, dairy cattle.
Ivivigarzama-Ivirsa	15	S	15	400	30	Yes	Oruro(428) Minas	Villa Tunari (56)	Plantains, corn, rice, citrus, yuca.

Location	Kms.	Road Type 2/	Length requiring improvmt.	Total small farms served	Small farms/ Km.	Connects with all-weather roads Yes/No	Distance to markets Kms.	Distance to Agric. Ext. Serv. Office	Importance
Aiquile-Taperas	97	ES	97	400	4	Yes	Aiquile(48)	Aiquile(48)	Wheat, corn, potatoes.
CHUQUISACA DEPARTMENT									
Punilla-Chaunaca-Potolo	40	ES	40	250	6	Yes	Sucre(50)	Sucre(50)	Fruits, barley
Quepupampa-Mojocoya	60	ES	30	500	16	Yes	Sucre(114)	Mojocoya(30)	One of the main productive areas of wheat.

SUMMARY

	Requested	Average Farms/Km.	% Total
La Paz Department	287	8.4	36%
Cochabamba Department	252	8.7	32%
Chuquisaca Department	70	11	9%
Santa Cruz Department	187	15	23%
TOTAL	796	10.19	100%

1/ As submitted to USAID/Bolivia in official requests of the Ministry of Agriculture and Campesino Development and Servicio Nacional de Caminos. July 1975.

2/ Road Types: CH - Camino Herradura (Horse Trail) ES - Estación Seca (Dry Weather) TT - Todo Tiempo (All Weather) SC - Senda Camionable (Truck Trail)

3/ Only includes farms fronting on road. Area of influence could increase number by factor of 2 to 5 times this amount.

4/ Dependent on improvement of road leading to this road, which is also included in Candidate Road Lists.

ADDITIONAL POSSIBLE LIST OF CANDIDATE ROADS (1686 Kms)

LOCATION:	Kms.
LA PAZ DEPARTMENT	386
Puente Villa-Cr. Suiqui-Chilata	17
Coripata-Marquirivi-Choquechaca	20
Tigretrampa-San Juan Mayo	14
Puri-Tigretrampa-Nogalani-Tablería	35
Las Mercedes-Totora Grande	14
Mocomoco-Chuma	40
Humacha-Ambaná	56
San Pedro-Incahuara	12
Puerto Acosta-Ninantaya	13
Humacha-Sorejaya-Combaya	27
Curupampa-Ilabaya	5
Laripata-Tintilaya	15
Toquina-Oje	11
San Andrés de Machaca-Achiri	25
Apaña-Collana-Tahuapalca	22
Carrasco-Challhuani	8
Ocobaya-Cutusuma	5
Choquechaca-Chaín	7
Totora-La Asunta	40
COCHABAMBA DEPARTMENT	359
Montepunco-Collpa-Chillijchi-Conde	36
Quillacollo-Molles-Santivañez-Playa Ancha	40
Tirque-Famadas	21
Chacón Ckasa-Rinconada	8
Tuticollo-Sipe Sipe-Viloma	8
Tiquipaya-Puca Puca-La Cumbre	28
Antaque-Molinos	9
Cr. Rt. 4835 - Chapicirca	15
Chimoré-Lobo Rancho	17
Rocha Rancho-Huayñacota	11
Cuchu Punata-Villa Evita	8
Villa Rivero - Hayarrumi	22
Camacho Rancho-Pampa Kase	9
Tifrasca-La Viña	18
Totora-Apacheta-Mizque	41
Arani-Toralapa	20
Tutimayu-Chaqui Oreko	15
Villa Tunari-Copacabana	6
Corani-Tablas	27

LOCATION	Kms
CHUQUISACA DEPARTMENT	493
Imilla-Huañusca-Poroma	45
Sangochipa-Cantu Molino	30
Canu Molino-Soico	6
Pojpo-Piocera	14
Punilla-Mama Huasi-Chinacas	22
Punilla-Maragua	33
Yotalilla-Tasa Pampa-Tuero	22
Pulqui Alto-Tasa Pampa	11
El Chaco-Pajcha-Cienega	55
Kora Kora-Arabate	20
Titina-Naunaca-Kavale	27
Puca Pampa-El Cerro	25
Peña Colorada-Pasorapa	46
Cr. Rt. 2010-Chijmuri	16
Tarabuco-Presto	40
Lajas Tambo-Pojpo	36
Padilla-Villa Serrano-Mendoza	45
SANTA CRUZ DEPARTMENT	448
Comarapa-Chilón-Oconis	35
Pampa Redonda - Moro Moro-Abra Grande	31
Abra del Quiñe-Tabla Cuchu	35
Ayacucho-Terebinto-El Hondo	47
Ayacucho-Magué	16
Santa Rita - Colonia Tupiza	12
Los Negros-Santa Rosa	15
Santa Rosita-Mosquera	35
Santa Cruz-Terrado-El Espino	41
La Loma-Caimanes	55
Cotoca-El Espino	19
Cr. Rt. 4 - Villa Florida	18
Vallegrande-Abra de Tablas	48
Guadalupe-Pucará	41

Exhibit 1: Comparison of Alternative Technologies

TABLE III-1a

PRELIMINARY ASSESSMENT OF LABOR/CAPITAL MIXES

I. May Be Done By Machine Or Hand

A. Clear and grub
B. Roadway excavation
C. Ditch excavation
D. Stockpile and screen aggregate
E. Load aggregate
F. Level surface and spread aggregate

II. Should Be Done By Hand Labor

G. Culvert, retaining wall and ford excavation
H. Construction of culverts, retaining walls and fords
I. Installation of concrete pipe

III. Should Be Done By Machine

J. Transportation of aggregate
K. Crushing of aggregate
L. Watering and compacting

TABLE III-1b

SUMMARY OF ALTERNATIVES

Alt/Item	A	B	C	D	E	F	Cost 2/ (US$ 000)
1	Machine	Hand	Machine	Machine	Machine	Machine	26,946
2	Hand	Hand	Hand	Machine	Machine	Machine	27,692
3	Machine	Hand	Hand	Machine	Machine	Machine	27,574
4	Hand	Hand	Hand	Machine	Machine	Hand	28,006
5	Machine	Hand	Machine	Hand	Machine	Hand	28,941
6	Hand	Machine	Machine	Hand	Hand	Hand	11,559
7	Machine	Machine	Hand	Hand	Hand	Hand	12,065
8	Hand	Machine	Machine	Hand	Machine	Machine	10,812
9	Machine	Machine	Hand	Hand	Hand	Machine	11,755
10	Machine	Machine	Hand	Hand	Machine	Machine	11,318
11	Hand	Machine	Machine	Hand	Hand	Machine	11,249

1/ This table is based on preliminary information and is used for illustrative purposes only. Minor changes would be expected between the relative costs of the various alternatives. Discrepancies with the final analyses presented in the following tables is due to subsequent refinements in these analyses. Not included in costs: (i) unamortized value of equipment; (ii) miscellaneous non direct costs, i.e., T/A, R&D, Tng; (iii) "In Kind" contributions from GOB and communities. Included in Costs: (i) Engineering and Surveying; (ii) Support.

2/ Hand Labor priced at $2.89/day.

TABLE III-2

MAN MONTHS OF HAND LABOR

(Shown in Parenthesis)

	Item Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
1	Clear and Grub	Hand(1,700)	Hand(1,700)	Machine	Hand(1,700)	Hand(1,700)	Hand(1,700)
2	Roadway Excav.	Machine	Machine	Machine	Machine	Machine	Machine
3a	Side Ditch Excav.	Hand(6,600)	Machine	Hand(6,600)	Hand(6,600)	Machine	Machine
3b	Retain. Wall Excav.	" (70)	Hand (70)	" (70)	" (70)	Hand (70)	Hand (70)
3c	Ford Excav.	" (50)	" (50)	" (50)	" (50)	" (50)	" (50)
3d	Culvert Excav.	" (350)	" (350)	" (350)	" (350)	" (350)	" (350)
4a	Const.Masonary Culverts	" (200)	" (200)	" (200)	" (200)	" (200)	" (200)
4b	Const. Retain. Walls	" (300)	" (300)	" (300)	" (300)	" (300)	" (300)
4c	Const. Fords	" (300)	" (300)	" (300)	" (300)	" (300)	" (300)
4d	Const. Headwalls	" (1,300)	(1,300)	" (1,300)	" (1,300)	" (1,300)	(1,300)
5a	Stockpiling & Screen Gravel	" (28,000)	Hand (28,000)	" (28,000)	" (28,000)	" (28,000)	Hand (28,000)
5b	Load Gravel	Machine	Machine	Machine	Machine	Machine	Machine
5c	Transport Gravel	Machine	Machine	Machine	Machine	Machine	Machine
6a	Crush Agg.	Machine	Machine	Machine	Machine	Machine	Machine
6b	Load, Crushed Agg.	Machine	Machine	Machine	Hand (1,000)	Hand (1,000)	Hand (1,000)
6c	Transport Crushed Agg.	Machine	Machine	Machine	Machine	Machine	Machine
7	Install C. P.	Hand (200)	Hand (200)	Hand (200)	Hand (200)	Hand (200)	Hand (200)
8	Level & Finish Road bed	Machine	Machine	" (3,500)	Machine	" (3,500)	Machine
9	Spread Surface Material	Hand (1,000)	Hand (1,000)	Hand (1,000)	Machine	Hand (1,000)	Hand (1,000)
	TOTAL MAN-MONTHS	40,070	33,470	41,870	40,070	37,970	34,470
	Man-Months/Km.	33.4	28.0	34.9	33.4	31.6	28.7

UNCLASSIFIED
Annex III

TABLE III-3
FINANCIAL COST (US$ 000)

Voluntary Labor at $0.00

	Function	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
1	Clear and Grub	70	70	92	70	70	70
2	Roadway Excav.	3,296	3,296	3,296	3,296	3,296	3,296
3a	Side Ditch Excav.	240	262	240	240	262	262
3b	Retain. Wall Excav.	0	0	0	0	0	0
3c	Ford Excav.	0	0	0	0	0	0
3d	Culvert Excav.	0	0	0	0	0	0
4a	Const. Masonry Culverts	18	18	18	18	18	18
4b	Const. Retain. Walls	25	25	25	25	25	25
4c	Constr. Fords	26	26	26	26	26	26
4d	Const. Headwalls	126	126	126	126	126	126
5a	Stockpiling & Screen Gravel	95	95	95	95	95	95
5b	Load Gravel	411	411	411	411	411	411
5c	Transport Gravel	1,099	1,099	1,099	1,099	1,099	1,099
6a	Crush Agg.	99	99	99	99	99	99
6b	Load, Crush Agg.	42	42	42	1	1	1
6c	Transport Crushed Agg.	123	123	123	127	127	127
7	Install C.P.	920	920	920	920	920	920
8	Level & Finish Roadbed	67	67	10	67	10	67
9	Spread Surface Material	3	3	3	26	3	3
	Sub-Total Alternatives	6,656	6,682	6,621	6,642	6,588	6,645
10	Watering & Compacting	509	509	509	509	509	509
11	Support Equipment	502	502	502	502	502	502
12	Support Personnel (Incl. Mech.)	920	920	920	920	920	920
13	Engineer.	470	470	470	470	470	470
	Sub-Total Direct Roads Costs	9,057	9,083	9,022	9,043	8,989	9,046
	Does not Include:						
	Unamortized value of equipment						2,504
	Miscellaneous non-road direct Costs						400
	Market Value of in kind labor and Materials						3,420

TABLE III-4

ECONOMIC COST (US$000)

(Voluntary Labor at $0.56/day)

	Function	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
1	Clear and Grub	99	99	92	99	99	99
2	Roadway Excav.	3,296	3,296	3,296	3,296	3,296	3,296
3a	Side Ditch Excav.	328	262	328	328	262	262
3b	Retain Wall Excav.	1	1	1	1	1	1
3c	Ford Excav.	1	1	1	1	1	1
3d	Culvert Excav.	6	6	6	6	6	6
4a	Const.Masonary Culvert	21	21	21	21	21	21
4b	Const. Retain. Walls	30	30	30	30	30	30
4c	Const. Fords	31	31	31	31	31	31
4d	Constr. Headwalls	148	148	148	148	148	148
5a	Stockpiling & Screen Gravel	578	578	578	578	578	578
5b	Load Gravel	411	411	411	411	411	411
5c	Transport Gravel	1,099	1,099	1,099	1,099	1,099	1,099
6a	Crush & Screen Agg.	99	99	99	99	99	99
6b	Load Crushed Agg.	42	42	42	18	18	18
6c	Transport Agg.	123	123	123	127	127	127
7	Install C.P.	921	921	921	921	921	921
8	Level & Finish	67	67	70	67	70	67
9	Spread Surface Material	5	5	5	26	5	5
	Sub-Total	7,306	7,240	7,302	7,328	7,223	7,220
10	Other Direct Road Costs	2,041	2,041	2,041	2,041	2,041	2,041
	TOTAL DIRECT ROAD COSTS	9,347	9,281	9,343	9,369	9,264	9,261

TABLE III-5

ROAD IMPROVEMENT/CONSTRUCTION FINANCIAL COST ANALYSIS; TECHNOLOGY: INTENSIVE HAND LABOR
ASSUMING PAID LABOR AT $86.70 Mo.
(US$ 000)

	FUNCTION	QUANTITY	UNIT	EQUIPMENT COST	LABOR: SKILLED OPERATORS FOREMEN	LABOR: UNSKILLED	LABOR: MAN/MONTHS	CONSTRUCTION MATERIALS & TOOL COST	TOTAL COST
1	Clearing & Grubbing	300	Ha.	15	5	144	1,700	50	214
2	Roadway Excavation								
	a. Common	5,280,000	m3	500	370	10,597	122,200	600	12,067
	b. Rock	1,320,000	m3	150	110	7,947	91,700	963	9,170
3	Other Excavation								
	a. Side Ditch								
	Common	176,000	m3	26	8	260	3,000	60	354
	Rock	44,000	m3	15	8	317	3,600	96	436
	b. Retaining Walls			Neg.	Neg.	6	70	Neg.	6
	c. Fords			Neg.	Neg.	4	50	Neg.	4
	d. Culverts			Neg.	Neg.	30	350	Neg.	30
4	Masonry Work								
	a. Culverts; Masonry Type	2,500	m3	Neg.	6	16	200	12	34
	b. Retaining Walls	3,600	m3	Neg.	7	23	300	18	48
	c. Fords	4,000	m3	Neg.	6	25	300	20	51
	d. Headwalls	18,000	m3	Neg.	35	115	1,300	91	241
5	Surfacing; river bed gravel								
	a. Stockpiling & Screening	688,500	m3	None	None	2,490	28,000	95	2,585
	b. Loading	688,500	m3	-	-	798	9,200	4	802
	*c. Transport to Job Site	688,500	m3	951	201	-	-	-	1,152
6	Aggregate; Crushed								
	*a. Crushing and Screening	76,500	m3	90	9	-	-	-	99
	b. Loading	76,500	m3	-	-	87	1,000	1	88
	* c. Transport to Job Site	76,500	m3	105	22	-	-	-	127
7	Concrete Pipe Culvert Instal.	18,000	m3	Neg.	Neg.	18	200	920	938
8	Roadbed Leveling			---	---	303	3,500	10	313
9	Surface Material Spreading			Neg.	Neg.	87	1,000	3	90
*10	Watering & Compacting			309	200	-	-	-	509
11	Support (including mechanics)			150	50	-	-	-	200
12	Engr.			-	470	-	-	-	470
		TOTALS		2,311	1,506	23,267	267,670 Man-Months	2,943	30,005

* Done by Equipment

TABLE III-6

ROAD IMPROVEMENT/CONSTRUCTION ECONOMIC COST: TECHNOLOGY: INTENSIVE HAND LABOR ($0.56/day)

(US$ 000)

	FUNCTION	QUANTITY	UNIT	EQUIPMENT COST	LABOR SKILLED: OPERATORS FOREMAN	LABOR UNSKILLED	CONSTRUCTION MATERIALS & TOOL COST	TOTAL COST
1	Clearing & Grubbing	300	NA	15	5	29	50	99
2	Roadway Excavation							
	a. Common	5,280,000	m3	500	370	2,119	600	3,589
	b. Rock	1,320,000	m3	150	110	1,589	963	2,812
3	Other Excavation							
	a. Side Ditches							
	Common	176,000	m3	26	8	52	60	146
	Rock	44,000	m3	15	8	63	96	182
	b. Retaining Walls			-	-	1	-	1
	c. Fords			-	-	1	-	1
	d. Culverts			-	-	6	-	6
4	Masonry Work							
	a. Culverts; masonry type	2,500	m3	-	6	3	12	21
	b. Retaining Walls	3,600	m3	-	7	5	18	30
	c. Fords	4,000	m3	-	6	5	20	31
	d. Headwalls	18,000	m3	-	35	23	91	149
5	Surfacing; gravel							
	a. Stockpiling & Screening	688,500	m3	-	-	485	95	580
	b. Loading	688,500	m3	-	-	160	4	164
	*c. Transport to job site	688,500	m3	951	201	-	-	1,152
6	Aggregate; Crushed							
	*a. Crushing & Screening	76,500	m3	91	8	-	-	99
	b. Loadi	76,500	m3			17	1	18
	*c. Transport to job site	76,500	m3	105	22	-	-	127
7	Concrete Pipe Culvert Instal.	18,000	m3	-	-	4	920	924
8	Roadbed Level			-	-	60	10	70
9	Surface Material Spreading			-	-	21	3	24
*10	Watering & Compacting			309	200	-	-	509
11	Support Equipment			150	50	-	-	200
12	Engr.			-	470	-	-	470
			TOTALS	2,311	1,506	4,743	2,943	11,404

* Done by Machine.

TABLE III-7

ROAD IMPROVEMENT/CONSTRUCTION FINANCIAL ANALYSIS; TECHNOLOGY: CAPITAL INTENSIVE

	FUNCTION	QUANTITY	UNIT	EQUIPMENT COST	LABOR SKILLED: OPERATORS FOREMEN	LABOR UNSKILLED MAN/MONTHS	CONSTRUCTION MATERIALS & TOOL COST	TOTAL COST
1	Clearing and Grubbing	300	Ha.	86	6			92
2	Roadway Excavation							
	a. Common	5,280,000	m3	1,103	241			1,344
	b. Rock	1,320,000	m3	669	573		710	1,952
3	Other Excavation							
	a. Side Ditches & Culverts							
	Common	176,000	m3	130	20			150
	Rock	44,000	m3	15	17		80	112
	b. Retaining Walls			20	4		-	24
	c. Fords			20	4		-	24
	d. Culverts			60	12		-	72
4	Masonry Work							
	*a. Culverts; Masonry Type	2,500	m3	-	6	200	12	18
	*b. Retaining Walls	3,600	m3	-	7	300	18	25
	*c. Fords	4,000	m3	-	6	300	20	26
	*d. Headwalls	18,000	m3	-	35	1,300	91	126
5	Surfacing; River bed Gravel						-	
	a. Stockpiling & Screening	688,500	m3	778	122		-	900
	b. Loading	688,500	m3	344	67			411
	c. Transport to Job Site	688,500	m3	954	145		-	1,099
6	Aggregate; Crushed							
	a. Crushing & Screening	76,500	m3	91	8		-	99
	b. Loading	76,500	m3	35	7		-	42
	c. Transport to Job Site	76,500	m3	105	22		-	127
*7	Concrete Pipe Culvert Instal.	18,000	m3			1,000	923	923
8	Roadbed Leveling			59	8		-	67
9	Surface Material Spreading			24	2		-	26
10	Watering & Compacting			309	200		-	509
11	Support including mechanics			502	920		-	1,422
12	Engr.			-	470		-	470
		TOTALS		5,304	2,902	3,100 Man/Months	1,854	10,060

* Done by Voluntary Labor priced at $0.00

ROAD IMPROVEMENT/CONSTRUCTION FINANCIAL ANALYSIS: TECHNOLOGY: MODIFIED LABOR INTENSIVE-ALTERNATE 6

Assuming Voluntary Labor at $0.00

(US$000

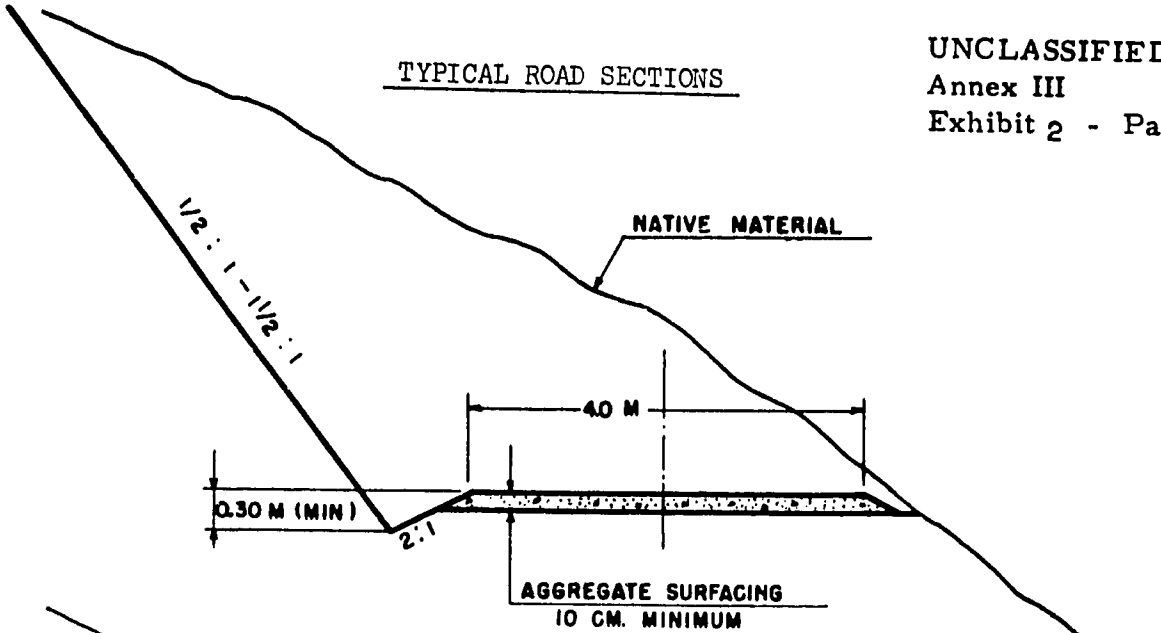
	FUNCTION	QUANTITY	UNIT	EQUIPMENT	LABOR: SKILLED OPERATORS FOREMEN	LABOR: UNSKILLED MAN/MONTHS	CONSTRUCTION MATERIALS & TOOL COSTS	TOTAL COST
1	Clearing and Grubbing	300	Ha.	15	5	1,700	50	70
2	Roadway Excavation							
	a. Common	5,280,000	m3	1,103	241	0		1,344
	b. Rock	1,320,000	m3	669	573	0	710	1,952
3	Other Excavation							
	a. Side Ditches & Culverts							
	Common	176,000	m3	130	20	0		150
	Rock	44,000	m3	15	17	0	80	112
	b. Retaining Walls			-	-	70	-	-
	c. Fords			-	-	50	-	-
	d. Culverts			-	-	350	-	-
4	Masonry Work							
	a. Culverts; masonry type	2,500	m3	-	6	200	12	18
	b. Retaining walls	3,600	m3	-	7	300	18	25
	c. Fords	4,000	m3	-	6	300	20	26
	d. Headwalls	18,000	m3	-	35	1,300	91	126
5	Surfacing; River Bed Gravel							
	a. Stockpiling & Screening	688,500	m3			28,000	95	95
	b. Loading	688,500	m3	344	67	0		411
	c. Transport to Job Site	688,500	m3	954	145	0		1,099
6	Aggregate; Crushed							
	a. Crushing and Screening	76,500	m3	91	8	0		99
	b. Loading	76,500	m3	-	-	1,000	1	1
	c. Transport to Job Site	76,500	m3	105	22	0		127
7	Concrete Pipe Culvert Instal.	18,000	m3	-	-	200	920	920
8	Roadbed Leveling			59	8	0	-	67
9	Surface Material Spreading			-	-	1,000	3	3
10	Watering & Compacting			309	200	0	0	509
11	Support (including mechanics)			502	-	-	-	502
12	Support Personnel			-	920	-	-	920
13	Engr.			-	470	-	-	470
			TOTALS	4,296	2,750	34,470 Man/Months	2,000	9,046

DESIGN CRITERIA

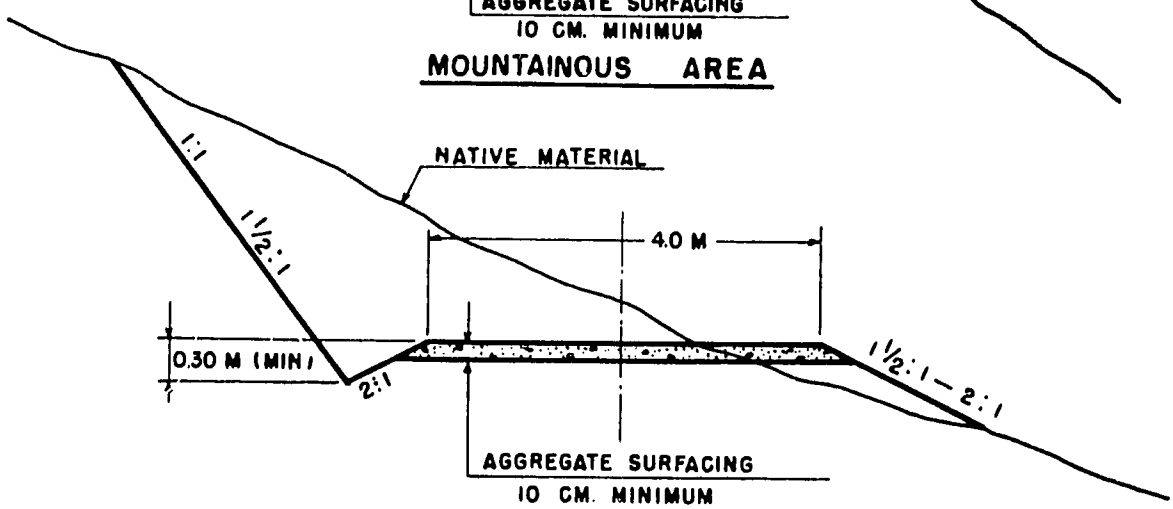
The Rural Access Roads will be designed for H-10 to H-15 (AASHO) loading, with a minimum of 4 meters roadbed and gravel surfacing of 5 to 15 cms. of thickness to provide all weather access. The project area involves flat lands, high valleys and mountainous terrain. No major drainage structures will be constructed. Concrete pipes masonry arches and stone fords will be used for minor drainage. Turnouts properly spaced will be provided for vehicle passing.

	Design Standards	Min.	Max.
1.	Roadway width	4 m.	5 m.
2.	Surface thickness	5 cms	15 cms.
3.	Capacity (AASHO)	H-10	H-15
4.	Length of curves	20 m.	-
5.	Fill slopes	1 1/2 : 1	3 : 1
6.	Cut slopes	1/2 : 1	1 1/2 : 1
7.	Grades: cut	0.3%	15%
	fill	0%	10%
8.	Cross slopes	2%	4%

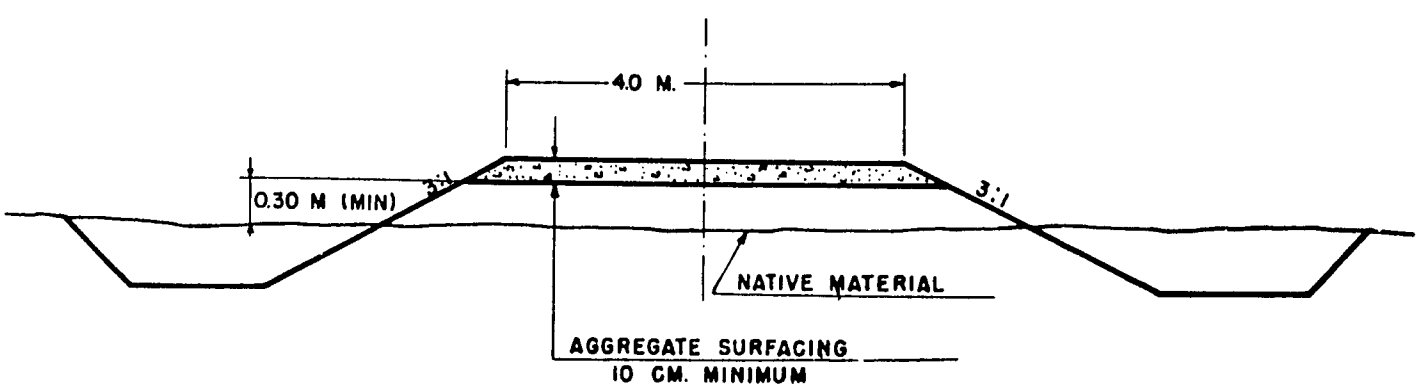
TYPICAL ROAD SECTIONS



MOUNTAINOUS AREA



HIGH VALLEY



FLAT AREAS

TYPICAL SECTIONS

SUMMARY

WORK QUANTITIES

ITEM	QUANTITY
Roadway Excavation	
Common	5,280,000 m3
Rock	1,320,000 m3
Excavation for drainage	
Common	176,000 m3
Rock	44,000 m3
Concrete Pipe Installation	
1 meter diameter	6,000 m.
0.6 meter diameter	21,000 m.
Stone Masonry	
Stone culverts	2,500 m3
Retaining Walls	3,600 m2
Fords	4,000 m3
Head walls	18,000 m3
Surfacing Material	
River bed gravel	688,500 m3
Crushed aggregate	76,500 m3

COST OF MATERIALS

ITEM	QUANTITY	TOTAL COST
Cement	2,530 MT	$140,000
Dynamite	30,000 Cases	790,000
Concrete Pipe	27,000 M.	920,000

EARTHWORK RATES ESTIMATED

For improving the 3 categories of Existing Roads

	Category 1 m3/Km.	Category 2 m3/Km.	Category 3 m3/Km
Mountainous	15,000	6,500	4,000
Valley	11,000	5,000	3,000
Flat Land	-	2,500	1,800

Category 1: Roadway partially cleared, no existing roadbed.
Category 2: Roadway partially cleared, some elevated roadbed.
Category 3: Roadway cleared, majority of roadbed exists.

VOLUME OF EARTHWORK BY DEPARTMENTS
(M^3's)

	Mountainous	Valley	Flat Land	Total
La Paz	1,900	300	-	2,200
Cochabamba	200	1,980	70	2,250
Chuquisaca	-	1,300	-	1,300
Santa Cruz	190	600	60	850
	2,290	4,180	130	6,600

AVERAGE HAUL DISTANCE FOR SURFACING MATERIAL

Department	Distance (Km)
La Paz	17.6
Cochabamba	11.9
Chuquisaca	6.7
Santa Cruz	15.8

HEAVY EQUIPMENT LIST

	ITEM	UNIT COST	TOTAL COST
1.	16 Tractors w/dozer	$ 105,400	$ 1,686,400
2.	7 Track type loader	56,000	392,000
3.	5 Motor graders	40,000	200,000
4.	4 Crushing Plants (6 m3 p/hr.)	30,000	120,000
		Sub-Total	2,398,400
		Escalation 12%	287,800
		Sub-Total	$2,686,000

LIGHT EQUIPMENT LIST

	ITEM	UNIT COST	TOTAL COST
1.	41 Dump Trucks (5 cu.yd.)	$ 23,000	$ 943,000
2.	7 Sheeps foot Rollers	6,500	45,500
3.	4 Trucks (6 MT)	9,200	36,800
4.	9 Pick-Ups (4 wheel drive)	7,500	67,500
5.	4 Water trucks	27,500	110,000
6.	4 Lube/Shop Trucks	37,000	148,000
7.	4 Fuel Tank Trucks	17,500	70,000
8.	4 Low Boy and Tractor	40,000	160,000
9.	2 Station Wagons	10,000	20,000
10.	16 Compressors	17,800	284,000
11.	48 Jack Hammers	800	38,400
		Sub-Total	1,923,000
		Escalation 12%	231,000
		Sub-Total	2,154,000
		Total (All Equipment)	4,840,000
		Spare Parts 20%	968,000
		GRAND TOTAL	$5,808,000

EQUIPMENT DISTRIBUTION BY DEPARTMENTS

Item	Main Office	La Paz	Cocha-bamba	Chuqui-saca	Santa Cruz
Tractor	-	5	6	3	2
Front Loader	-	2	3	1	1
Motor Grader	-	1	2	1	1
Crushing Plant	-	1	1	1	1
Dump Truck	-	10	16	6	9
6-Ton Truck	-	1	1	1	1
Pick-up Truck	1	2	2	2	2
Water Truck	-	1	1	1	1
Lube/Shop Truck	-	1	1	1	1
Fuel Tank Truck	-	1	1	1	1
Low boy and tractor	-	1	1	1	1
Station Wagon	2	-	-	-	-
Compressor	-	5	5	3	3
Jack Hammer	-	15	15	9	9

HAND TOOLS

No.	ITEM	Cost
5500	Picks	$ 23,100
5500	Hand shovels	22,000
3900	Wheelbarrows	101,400
L. S.	Sieves	3,500
		$ 150,000

HAND TOOLS

DISTRIBUTION BY DEPARTMENTS

	La Paz	Cocha-bamba	Chuqui-saca	Santa Cruz
Picks	920	2290	1370	920
Hand shovels	920	2290	1370	920
Wheelbarrows	650	1630	970	650

COMPOSITION OF EACH EARTHMOVING GROUP FOR LA PAZ DEPARTMENT

Basic Group (2 ea.)

Equipment		Personnel	
3	Tractors 1/	1	Foreman (Heavy Equipment)
1	Front Loader	1	Foreman (Light Equipment)
		4	Operators 1/
4	Dump Trucks	5	Drivers
2	Compressors	2	Assist. Operators
6	Jack Hammers	2	Compressors Op.
1	Sheeps Foot Roller	6	Drillers
		1	Watchman

1/ One group has only 2 tractors and 3 operators.

Supporting Group (1 ea.) (for the 2 basic groups)

Equipment		Personnel	
1	Crushing Plant	2	Operator
1	6 Ton Truck	7	Drivers
2	Dump Trucks	1	Soil Tester
1	Water Truck	1	Camp Employee
1	Lube/Shop Truck	1	Mechanic
1	Fuel Tank Truck	1	Assist. Mechanic
1	Low Boy and tractor	3	Massons
1	Compressor		
3	Jack Hammers		
1	Motor Grader		

COMPOSITION OF EACH EARTHMOVING GROUP FOR COCHABAMBA DEPARTMENT

Basic Group (3 ea.)

Equipment		Personnel	
2	Tractors	1	Foreman (Heavy Equip.)
1	Front Loader	1	Foreman (Light Equip.)
5	Dump Trucks	3	Operators
1	Compressor	2	Asst. Op.
3	Jack Hammers	5	Drivers
1	Sheep Foot Roller	1	Compressor Op.
		3	Drillers
		1	Watchman

Supporting Group (1 ea.) (For the 3 basic Groups)

Equipment		Personnel	
1	Crushing Plant	2	Operator
1	6 Ton. Truck	6	Drivers
1	Dump Truck	1	Soil Tester
1	Water Truck	1	Compressor Operator
1	Lube/Shop Tank	3	Drillers
1	Fuel Tank Truck	1	Camp Employee
1	Low Boy and Tractor	1	Mechanic
2	Compressor	1	Mechanic
6	Jack Hammer	1	Assist. Mechanic
2	Motor Grader	6	Masons

COMPOSITION OF THE EARTHMOVING GROUP FOR CHUQUISACA DEPARTMENT

Basic Group (1 ea.)

Equipment	Personnel
3 Tractors	1 Foreman (Heavy Equip.)
1 Front Loader	1 Foreman (Light Equip.)
5 Dump Trucks	4 Operators
2 Compressors	5 Drivers
6 Jack Hammers	2 Assist. Op.
1 Sheeps Foot Roller	2 Compressor Op.
	6 Drillers
	1 Watchman

Supporting Group (1 ea.) (For the Basic Group)

Equipment	Personnel
1 Crushing Plant	2 Operator
1 6-Ton truck	1 Assist. Operator
1 Dump Truck	6 Drivers
1 Water Truck	1 Soil Tester
1 Lube/Shop Truck	1 Camp Employee
1 Fuel Tank Truck	1 Mechanic
1 Low Boy and Tractor	1 Assist. Mechanic
1 Compressor	4 Massons
3 Jack Hammers	
1 Motor Grader	

COMPOSITION OF THE EARTHMOVING GROUP FOR SANTA CRUZ DEPARTMENT

Basic Group (1 ea.)

Equipment		Personnel	
2	Tractor	1	Foreman (Heavy Equip.)
1	Front Loader	1	Foreman (Light Equip.)
7	Dump Trucks	4	Operators
2	Compressors	7	Drivers
6	Jack Hammers	2	Assist. Op.
1	Sheeps Foot Roller	2	Compressor Op.
		6	Drillers
		1	Watchman

Supporting Group (1 ea.) (For the Basic Group)

Equipment		Personnel	
1	Crushing Plant	2	Operator
1	6-Ton Truck	1	Assistant Op.
2	Dump Trucks	7	Drivers
1	Water Truck	1	Soil Tester
1	Lube/Shop Tank	1	Camp Employee
1	Fuel Tank Truck	1	Mechanic
1	Low Boy and Tractor	1	Assist. Mech.
1	Compressor	2	Massons
3	Jack Hammers		
1	Motor Grader		

UTILIZATION OF THE EQUIPMENT

Equipment	Approximate Life (Hrs)	% Used	% Remaining
6 Tractors w/Dozer	8,000	56	44
8 Tractors w/Dozer	9,000	50	50
2 Tractors w/Dozer	10,000	45	55
7 Tracks type loaders	10,000	45	55
2 Motor graders	8,000	56	44
2 Motor graders	9,000	50	50
1 Motor grader	10,000	45	55
15 Dump Trucks	6,000	75	25
26 Dump Trucks	7,000	64	36
3 Pick-ups	6,000	67	33
4 Water trucks	7,000	57	43
4 Lube/Shop Trucks	7,000	30	70
4 Fuel tank trucks	7,000	30	70
4 Trucks (6 MT)	7,000	57	43
4 Low boys and trucks	6,000	33	67
2 Station Wagons	6,000	67	33
16 Compressors & JH	5,000	40	60
4 Crushing Plants	8,000	30	70

FUEL AND LUBE COSTS

Equipment	Working hours	Total cost * $
16 tractors	4,500	155,700
7 Front loaders	4,500	41,200
5 Motor graders	4,500	50,600
4 Crushing Plants	2,500	16,200
41 Dump trucks	4,500	256,500
4 Trucks (6 ton)	4,000	17,400
9 Pick-ups	4,000	32,200
4 Water trucks	4,000	19,800
4 Lube/shop trucks	2,000	9,900
4 Fuel Tank trucks	2,000	9,900
4 Low boy & Tractor	2,000	13,600
2 Station wagons	4,000	7,200
12 Compressors & J.H.	2,000	32,400
Total		$ 662,600

* Readjusted according to the new fuel prices and rate of consumption estimated by SNC.

AVERAGE CONSTRUCTION COST PER KILOMETER 1/

I. MOUNTAINOUS 2/

	Item	AID F/C	AID L/C	GOB Contribution	Total $
A.	Excavation	4,980		3,100	8.080
B.	Drainage		1,260	110	1,370
C.	Surfacing Aggr.	1,040		650	1,690
D.	Engineering			390	390
					11,580

II. HIGH VALLEY 3/

	Item	AID F/C	AID L/C	GOB Contribution	Total $
A.	Excavation	2,260		1,410	3,670
B.	Drainage		1,130	100	1,230
C.	Surfacing Aggr.	1,160		720	1,880
D.	Engineering			390	390
					7,170

III. FLAT LAND 4/

	Item	AID F/C	AID L/C	GOB Contribution	Total $
A.	Excavation	1,270		790	2,060
B.	Drainage		880	80	960
C.	Surfacing Aggr.	1,380		860	2,240
D.	Engineering			390	390
					5,650

1/ All equipment is considered to be 50% depreciated during disbursement period Does not include miscellaneous costs and market value of "in kind" labor and materials.

2/ Includes mountainous valleys in the Departments of La Paz, Cochabamba and Santa Cruz.

3/ Includes areas in the Departments of Cochabamba, Chuquisaca y Santa Cruz.

4/ Includes areas in the Departments of Cochabamba (Chapare) and Santa Cruz.

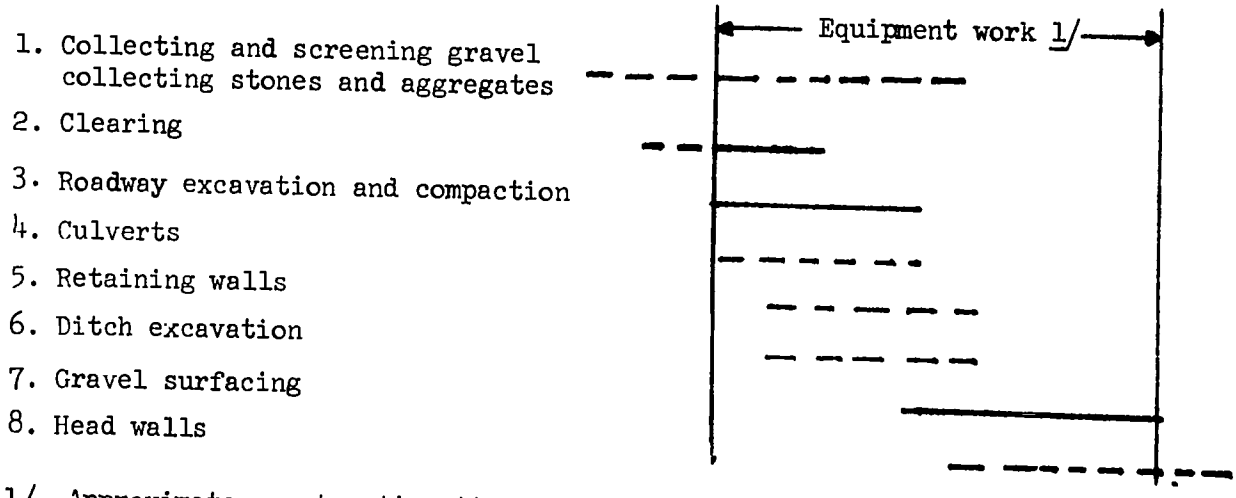
TYPICAL CONSTRUCTION WORK SCHEDULE

Each sub-project shall be divided in sections of 5 to 10 kilometers and the construction of each section will be performed with the following steps:

1. Collecting and screening gravel for surface course and collecting stones and aggregates for masonry.
2. Begins clearing.
3. Begin excavation and compaction;70% of gravel must be ready by this time and 100% of clearing must be completed.
4. Culvert excavation begins.
5. Work in retaining walls begins.
6. Ditch excavation begins.
7. Equipment begins surfacing. Culverts must be 100% installed. Ditch excavation should be 70% completed.
8. Head walls construction.

All steps must be completed before the rainy season.

CONSTRUCTION SCHEDULE FOR EACH SECTION OF 5 TO 10 Kms



1/ Approximate construction time for 10 kms of road if step 3 is immediately followed by step 7: Yungas, 5.1 Mos.; high valley, 2.7 Mos (using 3 tractors and 5 dump trucks); Flat area 2.3 Mos. (using 2 tractors and 5 dump trucks.

- - - - - - voluntary labor
——— equipment work

TABLE A :

ECONOMIC BENEFITS *

Summary of Sensivity Analysis:

1. Benefit/Cost Ratio 1.85
2. If Benefit reduced by 10%, then B/C = 1.67
3. If Cost increase by 10%, then B/C = 1.69
4. If both 2 and 3 above, then B/C = 1.52

Year (0)	Km. of Road Imprvmts. Completed In Period (1)	Value Of Benefits to all Farms Due To Improved Marketing (%) (2)	Net Farm Family Income From Crop Sales (3)	Incremental Income In US$ From (Column 2) (4)	Cumulative No. of Farms Benefitting From Improved Marketing (5)	Aggregate Incremental Income From Improved Marketing (000 $) (6)	Cumulative No. of Farms Benefitting From Induced Agric. Production (60% Accession) (7)	Value of Induced Agric. Production: % of Farm Income (8)	Value of Induced Agric. Production: Total Per Farm (000 $) (9)	Value of Induced Agric. Production: Aggregate Total (000 $) (10)	Aggregate Benefits To Small Farmers: Value (000 $) (11)	Aggregate Benefits To Small Farmers: 15% Discount (12)
1	0	0	410	0	0	0	0	0	0	0	0	0
2	160	9	410	0	2,000	0	1,200	6	25	30	104	90.5
3	480	3	447	37	8,000	74	4,800	9	58	160	502	379.6
4	560	2	470	60	15,000	342	9,000	8	101	435	1,425	937.0
5	360	2	480	70	19,500	990	11,700	6	138	841	2,006	997.4
6	240	2	489	79	22,500	1,165	13,500	4	166	1,321	2,844	1,246.8
7	160		499	89	24,500	1,523	14,700		166	1,784	3,618	1,378.9
8	120		499	89	26,000	1,834	15,600		166	2,140	4,216	1,522.5
9			499	89	26,000	2,076	15,600		166	2,363	4,566	1,297.9
10			499	89	26,000	2,203	15,600		166	2,498	4,764	1,178.6
11			499	89	26,000	2,266	15,600		166	2,564	4,864	1,045.5
12			499	89	26,000	2,300	15,600		166	2,590	4,904	916.6
13			499	89	26,000	2,314	15,600		166	2,590	4,904	797.0
14			499	89	26,000	2,314	15,600		166	2,590	4,904	693.1
15			499	89	26,000	2,314	15,600		166	2,590	4,904	602.7
												13,084.1

Adjustments:

Income Multiplier (Annex IV. Exhibit 3)	4,841.0
User-Cost Savings (Annex IV. Exhibit 2)	487.0
	18,412.1

* Refer to Table 12 in Economic Analysis for Additional information on assumption underlying columns 2 and 8.

TABLE B

FINANCIAL AND ECONOMIC 1/ COST ANALYSIS
('000 $)

Year	Km of Road Improvements Completed	A. I. D. Supported Costs: Equipment 2/	Material 3/	Hand Tools	Miscellaneous 4/	Total GOB Costs 5/	Village Input 6/ (Labor)	Road Maintenance Costs	Total Financial Costs	Total Economic Costs	Economic Costs at 15% Discount
0											
1	0	725	250	30	80	330	(100)	0 0	1,415	1,515	1,317.4
2	160	725	450	30	90	1,070	(117)	0	2,365	2,482	1,876.7
3	480	725	650	50	90	1,090	(117)	40 (61)	2,645	2,783	1,829.9
4	560	725	450	40	90	1,060	(117)	100 (121)	2,465	2,603	1,488.3
5	360	725				1,350	(117)	196 (217)	2,271	2,488	1,129.0
6	240	725				1,150	(117)	196 (217)	2,071	2,209	955.0
7	160	725				810	(80)	196 (217)	1,731	1,832	688.7
8	120	725				485	(45)	196 (217)	1,406	1,472	481.2
9	-	-	-	-	-	-	-	210 (231)	210	231	65
10	-	-	-	-	-	-	-	280 (301)	280	301	74
11	-	-	-	-	-	-	-	360 (381)	360	381	81
12	-	-	-	-	-	-	-	400 (421)	400	421	78
13	-	-	-	-	-	-	-	400 (421)	400	421	68
14	-	-	-	-	-	-	-	400 (421)	400	421	59
15	Residual value of road at 20% of costs				-2,577			400 (421)	-2,177	-2,156	-266
									Present Value		9,928.1
									C/B =	1.85	
								Without Residual	=	1.82	

1/ Figures in parenthesis indicate values attributed to Economic Analysis. Difference between economic and financial costs are derived from the shadow pricing of labor.
2/ Includes depreciation based on estimated 8-year life, plus spare parts costs.
3/ Imported and local materials.
4/ Includes the cost of small structures and 30% of technical assistance costs.
5/ Includes the cost of equipment operation including operators' wages, fuel and tubes and maintenance; engineering and professional services; construction personnel services. Beginning in year 5, includes material and miscellaneous costs. Any differences from Exhibit 3 in Annex V are attributable to lower overhead costs directly related to construction of roads in column 5.
6/ Financial cost is 0.

USER-COST SAVINGS IN TRANSPORTATION

User-cost savings in transportation derive from more efficient use of vehicles which results in a longer vehicle life; reduced labor requirements owing to decreases in travel time; more efficient fuel consumption; longer life-spans for tires; decreased maintenance costs; and lower insurance costs per kilometer since the vehicle can cover more territory. Table IV.2 itemizes these sources of user-cost savings, and estimates expected savings attributable to this Project.

The Rural Access Roads Project is expected to contribute to user-cost savings through the construction of 1200 kilometers during the Project disbursement period, and about 2000 kilometers during the eight-year life of the Project. The roads intended for upgrading are all of low-volume traffic, with a current average daily traffic (ADT) of about 2 truck equivalents. This is expected to increase to about 3 trucks to accommodate production increases. In Bolivia a high proportion of the rural transport of people and cargo is by truck, and it is expected that passenger car traffic will be negligible along roads financed by this Project. The average size of trucks used in the Project areas is expected to be 6 1/2 tons. At the current rate of 2 vehicle equivalents per day, over a 300-day work year, truck traffic is expected to grow by 8% per year for five years as a result of road improvements. This estimate is based on traffic required to haul the current marketable produce in the area as well as expected increases in production. (See Table 13 in Section III. C.3.).

Based on subproject applications in Table 6 of Section II.B.6, ten percent of the roads to be improved are horse trails at the present time. These trails carry no vehicular traffic. Mule and horse transport costs have been estimated at up to four times that of truck transport. Therefore user-cost savings will be greater for movement of a given tonnage when a horse trail has been converted to an all-weather road.

User-cost savings are calculated at about $0.04 per ton per kilometer, (as evidenced in Table IV.2) when all-weather roads or truck trails are up-graded. This accounts for about 1,800 kilometers during the eight-year Project life. User-cost savings for horse trails are calculated at $0.42 per ton per kilometer, since the cost of mule or horse transport is about $0.52, and truck transport will be about $0.10 per km/ton on all-weather roads. About 200 kilometers of horse trails will be up-graded as a result of this Project.

Current production levels within the target area are about 2,500,000 metric tons (See Table 13 in Section III.C) divided among 250,000 farm families. Thus each farmer produces an average of ten tons of which

about six tons are marketed. Assuming an average of ten kilometers of improved all-weather road (in addition to existing all-weather roads where transport costs will remain constant) between beneficiary farmers and their markets, user-cost savings should amount to about $2.40 per farmer on dry-weather roads and about $24 per farmer currently located on a horse-trail. This represents user-cost savings to the economy. These savings will be distributed among farmers, transporters and consumers in accordance with market forces. Table IV.2.B shows that user-cost savings to the economy have a present value of nearly $500,000.

TABLE 1 A

UNCLASSIFIED
ANNEX IV

USER COST SAVINGS FOR A 140 qq ($b.)
(6½ - Ton) TRUCK ON IMPROVED RURAL ACCESS ROADS/1/

Exhibit 2
Page 3 of 4

	Unimproved Rural Access Roads.	Roads Improved to Gravel All-Weather Standards.	Savings Through Road Improvement. Amount	% Savings
DEPRECIATION				
Delivered Cost of Vehicle	377,000	377,000		
Economic Life in years	8	10		
Residual Value of $b. 15,080 discounted at 15%	4,931	3,725		
Net Cost of Vehicle	372,069	373,275		
Kilometers Traveled/year	90,000	105,000		
Vehicle Life; Kilometrage	720,000	1,050,000		
Depreciation Charge per Vehicle-Kilometer	0.51676	0.35550	0.16126	31
WAGES				
Driver (monthly)	2,500	2,500		
Helper (monthly)	1,000	1,000		
Social charges	945	945		
Total monthly cost	4,445	4,445		
Total annual cost	53,340	53,340		
Kilometers Traveled/Year	90,000	105,000		
Wages/Vehicle- km.	0.59267	0.50800	0.08467	14
FUEL				
Gasoline Consumption; ltrs/100km.	50	35		
Kilometers traveled/year	90,000	105,000		
Liters of fuel Consumed/year	45,000	36,750		
Cost of Gasoline/liter	1.50	1.50		
Cost of Gasoline/year	67,500	55,125		
Cost of Gasoline/vehicle-km.	0.75000	0.52500	0.22500	29
TIRES				
Life of Tire in km.	40,000	60,000		
Unit Price	4,000	4,000		
Cost of six tires	24,000	24,000		
Cost per Vehicle-km.	0.60000	0.40000	0.20000	33
MAINTENANCE & SPARE PARTS				
Cost/Vehicle/year	20,000	14,000		
Km. traveled/year	90,000	105,000		
Cost/Vehicle-km.	0.22222	0.13333	0.08889	40
INSURANCE				
Cost of min. coverage/year	$b. 6.000	6.000		
Cost/Vehicle-km.	0.06667	0.05714	0.00953	14
TOTAL COST/VEHICLE-KM.				
	$b.2.69832	$b.1.97897	0.71935	
	US$ .1382	US$ .1018	.0364	26

1/ Source: Sociedad de Transportistas de 13 de Enero, Santa Cruz, Bolivia.

T A B L E - B

Economic Benefits from User-Cost Savings

Year	Km of Road (1)	Cumulative No.Of Farmers (2)	TONS. MARKETED Pre-Project Production1/ (3)	Incremental Production2/ (4)	Tons. Total (5)	User-Cost Saving (6)	Present Value (15% Discount) (7)
1	0	0	0	0	0	0	0
2	160	2,000	12,000	884	12,884	4,638	3,507
3	480	8,000	24,000	1,432	25,432	9,156	6,020
4	560	15,000	90,000	8,128	98,128	35,326	20,198
5	360	19,500	117,000	15,544	132,544	47,716	23,724
6	240	22,500	135,000	26,795	161,795	58,246	25,182
7	160	24,500	147,000	44,464	191,464	68,927	25,912
8	120	26,000	156,000	72,824	228,824	82,376	26,928
9		26,000	156,000	72,824	228,824	82,376	23,416
10		26,000	156,000	72,824	228,824	82,376	20,362
11		26,000	156,000	72,824	228,824	82,376	17,706
12		26,000	156.000	72,824	228,824	82,376	15,397
13		26,000	156,000	72,824	228,824	82,376	13,388
14		26,000	156,000	72.824	228,824	82,376	11,642
15		26,000	156,000	72,824	228,824	82,376	10,124
S U B T O T A L							243,506
Adjustment for Horsetrail (10% of Total) 3/							243,506
					T O T A L		487,012

1/ This figure is derived by multiplying the number of benefitted farmers by an average of 6 tons of marketed output per annum.

2/ This figure derives from the expected 12% per annum increase in production for 60% of farmers, and 4% for all farmers over a five-year period, after which time these income increases lend of.

3/ Although horsetrails are only 10% of total improvements, cost savings are nearly 10 times more, e.g. $0.42 per kilometer ton. rather than $0.04.

TABLE A

Income Multiplier Benefits
($000)

Year	GOB Local Cost Expenditures	Income Multiplier	Present Value (15% Discount)
1	476	953	829
2	476	953	721
3	953	1,906	1,253
4	953	1,906	1,090
5	953	1,906	948
TOTAL			$4,841

These benefit flows are based on a conservative income multiplier of 0.50. This multiplier is applied to financial expenditures for skilled labor and the local purchase of materials such as cement and concrete pipes.

BENEFIT-COST ANALYSES FOR ALTERNATE TECHNOLOGIES

Benefit-cost analyses for three representative technologies are based on the following assumptions:

1. A total of 1,200 kilometers will be built over a 4-year period.

2. Equipment and tools are amortized over an 8-year period. Only that portion of equipment value which is amortized over 4 years is included as a project cost.

3. The financial cost of unskilled labor is $2.89 per day, or $86.70 per month; and about $8.00 per day for skilled labor. The cost of unskilled labor is representative of agricultural wage rates. A limited supply of voluntary labor is used to construct culverts, fords and walls.

4. The multiplier effect for locally generated income is conservatively calculated at .50. This allows ample latitude for leakages attributable to:

a) hoarding and b) foreign exchange expenditures whose multipler effects "leak" to the exporting country.

5. All local expenditures are affected by the multiplier effect, while no foreign exchange costs are affected.

6. A fifteen percent discount rate is utilized.

The alternatives chosen for rough benefit cost analysis are as follows:

Alternative I: is the labor intensive option in Table III-5 of Annex III, Exhibit 1.

Alternative II: is Alternative 5 in Table III.I.A of Annex III, Exhibit 1.

Alternative III: is Alternative 9 in Table II.I.A of Annex III, Exhibit 1. This alternative is roughly comparable to the technology mix proposed in the PP. However, the B/C ratios are not comparable because the PP analysis makes no provision for the payment of unskilled labor.

Table A summarized the cost components of these alternatives. Tables B, C, and D set forth costs and benefits for each of the above alternatives. Alternative I is the most labor intensive of these alternatives. This alternative has the highest economic benefits, but also the highest cost.

Alternative II is also labor intensive, but a slight addition of machinery reduces overall project costs, while maintaining labor at about 80% of construction costs. The overall result is a slight reduction in both benefits and costs, with a comparable Benefit-Cost ratio.

Alternative III falls within the range of the six final alternatives from which the final technology mix was selected. Owing to lower costs, the B-C ratio for this alternative is the highest. However, overall benefits are less than half of those attributed to the labor intensive alternative. Thus from a cost-effectiveness point of view, the optimal alternative seems to be the modified capital intensive mix in Alternative III.

However, it must be pointed out that the above analysis is based on financial costs rather than economic cost. In other words, labor was not shadow priced. This approach was taken for two reasons: 1) since wages were included as benefits, and were subject to an income multiplier effect, a bias would have been introduced against the cost side if the value of labor were substantially reduced to its opportunity cost; and 2) the value of unskilled labor is close to market rate for agricultural labor; however, given the large amounts of labor involved, the opportunity cost could well increase. Furthermore, the opportunity cost of labor may be closer to the market rate, than to the rough calculations of foregone production cited in Section III.C.2. For the above reasons, the financial cost of labor was utilized. If an opportunity cost of $ 0.56 per day had been used, the B-C ratios for Alternatives I to III would probably have favored Alternative I.

TABLE A

COST ANALYSIS FOR ALTERNATIVE TECHNOLOGIES
(in 000 US$)

	FOREIGN EXCHANGE		LOCAL COSTS			
			LABOR			
Alternative	Equipment	Material & Tools	Skilled	Unskilled	Material 2/	TOTAL 1/
I.	2,311	1,882	1,506	23,267	1,061	30,027
II.	2,930	1,682	1,665	21,603	1,061	28,941
III.	3,574	672	2,411	4,037	1,061	11,755

1/ Does not include undepreciated value of equipment; non-direct costs such as T.A. research and training; and sufficient local labor to construct culverts, fords and headwalls.

2/ Includes cement and concrete pipe. All other material is imported, including hand tools.

SUMMARY OF BENEFIT-COST RATIOS

Alternative I = 1.94
Alternative II = 1.92
Alternative III = 2.12

TABLE B

BENEFIT-COST ANALYSIS - ALTERNATIVE I
(in 000 US$)

Year	COSTS F/X (1)	COSTS Local (2)	Presente Value Costs (15%) (3)	BENEFITS Agricultural Production (4)	BENEFITS Income Multiplier (5)	Present Value Benefit (15%) (6)
1	1,048	6,458	6,526	0	6,458	5,616
2	1,048	6,458	5,676	104	6,459	4,963
3	1,048	6,458	4,935	502	12,917	8,889
4	1,048	6,458	4,292	1,425	12,917	8,200
5				2,006	12,917	7,419
6				2,844		1,247
7				3,618		1,379
8				4,216		1,523
9				4,566		1,298
10				4,764		1,179
11				4,864		1,046
12				4,904		917
13				4,904		797
14				4,904		693
15				4,904		603
			21,429			45,769
Adjustment for Maintenance			653	Adjustment for User Cost		487
Adjustment for post project construc.			1,787			
TOTAL			23,869			46,256

Benefit- Cost = 1.94

TABLE C

BENEFIT-COST ANALYSIS - ALTERNATIVE II
(in 000 US$)

Year	COSTS F/X (1)	COSTS Local (2)	Present Value Costs (15%) (3)	BENEFITS Agricultural Production (4)	BENEFITS Income Multiplier (5)	Presente Value Benefit (15%) (6)
1	1,153	6,082	6,291	0	6,082	5,289
2	1,153	6,082	5,471	104	6,082	4,678
3	1,153	6,082	4,757	502	12,164	8,328
4	1,153	6,082	4,136	1,425	12,164	7,770
5				2,006	12,164	7,045
6				2,844		1,247
7				3,618		1,379
8				4,216		1,523
9				4,566		1,298
10				4,764		1,179
11				4,864		1,046
12				4,904		917
13				4,904		797
14				4,904		693
15				4,904		603
			20,656			43,792
Adjustments: 1. Maintenance			653	User Cost Adjustment		487
2. Post-Project construc.			1,787			
TOTAL			23,096			44,279

Benefit-Cost = 1.92

TABLE D

BENEFIT-COST ANALYSIS - ALTERNATIVE III
(in 000 US$)

Year	COSTS F/X (1)	COSTS Local (2)	Present Value Costs (15%) (3)	BENEFITS Agricultural Production (4)	BENEFITS Income Multiplier (5)	Present Value Benefit (15%) (6)
1	1,061	1,877	2,555	0	1,877	1,632
2	1,061	1,877	2,222	104	1,877	1,498
3	1,061	1,877	1,932	502	3,754	2,798
4	1,061	1,877	1,680	1,425	3,754	2,961
5				2,006	3,754	2,864
6				2,844		1,247
7				3,618		1,379
8				4,216		1,523
9				4,566		1,298
10				4,764		1,179
11				4,864		1,046
12				4,904		917
13				4,904		717
14				4,904		693
15				4,904		603
			8,389			22,435
Adjustment for Maintenance			653			
Adjs. for Post-Project Roads			1,787	Adjustment for User Cost		487
TOTAL			10,829			22,922

Benefit Cost = 2.12

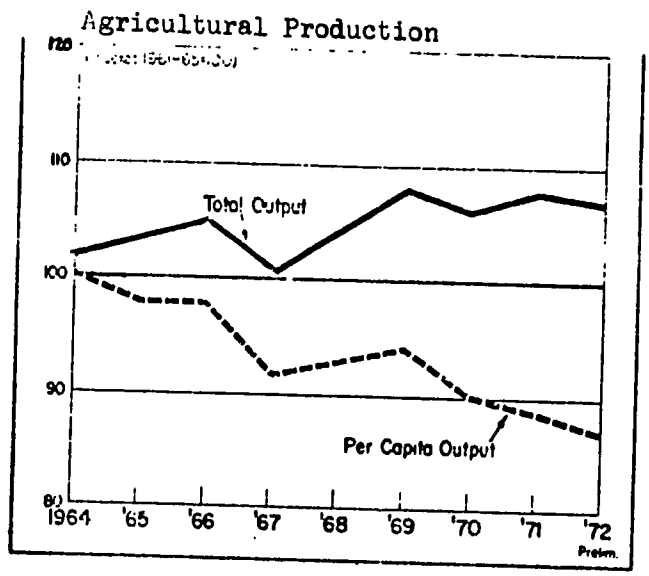
NOTE: This alternative approaches the one selected for final project use, with the important exception that unskilled labor is not paid. This difference reduces benefits by about 20%.

ANNEX IV

Exhibit 5
Page 1 of 1 page

AGRICULTURAL PRODUCTION AND PER CAPITA OUTPUT

1964 - 1972



Source: A.I.D. Economic Data Book, October, 1973.

TABLE A

Summary of Selected Data on Typical Sub-Projects

	Project "A"	Project "B"	Project "C"
Route	Tarata Isata	San Carlos-Antofagasta	Suapi-Santa Rosa
Location	Cochabamba Valley	Santa Cruz Lowlands	Yungas
Topography	Hilly	Flat land with poorly defined drainage patterns	Mountainous
Current Access	Unimproved single lane dirt road passable by vehicle only in dry season	Unimproved single lane road no drainage structures	Unimproved trail of which some segments are impassable by vehicles at any time.
Distance to be Improved	25 km.	29 km.	35 km.
No. of Farmers served	1,000	800	420
Major Crops	Wheat Barley Corn	Rice Corn Yuca Has excellent potential for sugarcane production	Coffe Citrus Rice
Benefit-Cost Ratio	1.13	1.97	1.35

TABLE A

SERVICIO NACIONAL DE CAMINOS
RECEIPTS FOR OPERATIONS BUDGET 1974-1983
(US$ 000)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Own Sources										
Prestación Vial Tax	73	90	99	109	120	132	145	160	176	193
Roads User Tax	269	330	363	399	439	483	532	585	643	707
Sale of Assets	122	150	165	182	200	220	242	266	293	322
Other	41	50	55	61	67	73	81	89	98	108
National Treasury										
For operations	6,289	7,724	8,496	9,346	10,280	11,309	12,440	13,684	15,052	16,558
Descentralized Agencies										
La Paz Agricultural Custom	48	59	65	71	79	87	95	104	115	127
Collections in Cochabamba	62	76	84	92	101	111	122	135	148	163
Total	6,904	8,479	9,327	10,260	11,286	12,415	13,657	15,023	16,525	18,178

NOTES:

1) Figures were based on 1975 data assuming a 10% increase per year for both increased operations and inflation.

2) This chart does not attempt to project any large increases in operational receipts due to possible future large scale road building programs.

3) Receipts for capital expenditures, construction of roads, bridges and buildings and payment of SNC's public debt are not included in above table.

TABLE B

SERVICIO NACIONAL DE CAMINOS
OPERATIONS EXPENDITURES BUDGET 1974-1983
(US$ 000)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Salaries of Permanent Employees	3,309	3,338	3,671	4,038	4,442	4,885	5,375	5,913	6,504	7,154
Salaries of Temporary Employees	25	51	56	62	68	75	83	91	100	110
Overtime Salary	29	57	63	69	76	84	92	101	111	122
Social Insurance contributions	417	683	751	826	909	999	1,099	1,209	1,330	1,463
Telephone and Cables	6	8	9	10	11	12	13	14	15	17
Electricity and Water	19	28	31	34	37	41	45	50	55	61
Publicity and Printing	26	50	55	61	67	74	81	89	98	108
Transportation and Travel Expenses	105	197	217	239	263	289	318	350	385	424
Rent	28	40	44	48	53	58	64	70	77	85
Maintenance and Repairs	423	862	948	1,042	1,146	1,261	1,387	1,526	1,679	1,847
Bank charges and Commissions	12	17	19	21	23	25	28	31	34	37
Taxes	4	5	6	7	8	9	10	11	12	13
Other Services	2	10	11	12	13	14	15	17	19	21
Stationary and Office Supplies	31	45	50	55	61	67	74	81	89	98
General Supplies	588	733	806	887	975	1,073	1,180	1,298	1,428	1,571
Construction and Maintenance Supplies	1,880	2,355	2,590	2,849	3,134	3,449	3,793	4,172	4,589	5,047
Total	6,904	8,479	9,327	10,260	11,286	12,415	13,657	15,023	16,525	18,178

NOTES:

1) Figures were based on 1975 data assuming a 10% increase per year for both increased operations and inflation.

2) This chart does not attempt to project any large increases in operational expenditures due to possible future large scale road building programs.

TABLE C

SNC AFTER-PROJECT COSTS 1/
($US 000)

	1981 (CY)	1982 (CY)	1983 (CY)	1984 (CY)	Total
Cash Outlays					
Salaries					
Engineering	95	100	105	110	410
Skilled labor	432	454	478	501	1,865
Support Labor	38	40	41	44	163
total Personnel	565	594	624	655	2,438
Fuel & Lube					
Construction	132	132	133	133	530
Maintenance	8	8	8	8	32
Training	3	3	2	2	10
Equipment Spare Parts	300	300	300	300	1,200
Contracts (small structures)	58	58	58	58	232
Operating Expenses	21	21	21	21	84
Materials (purchases)	160	160	160	160	640 2/
Total Cash	1,247	1,276	1,306	1,337	5,166
Non-Cash Outlays					
Materials					
Construction (crushed rock)	64	64	64	64	256
Maintenance	8	8	8	8	32
Total non-cash	72	72	72	72	288
Total cash & Non-cash	1,319	1,348	1,378	1,409	5,454 3/
Cash Contribution					
Salaries, Travel	12	12	12	12	48
Total Cash	12	12	12	12	48
MACAG					
Cash Contribution	6	6	6	6	24
: cash	18	18	18	18	72
Total GOB after Project Costs	1,337	1,366	1,396	1,427	5,526

1/ SNC's after-Project costs are higher than during-Project costs since SNC will assume road maintenance expenses plus inputs for the construction of new roads formerly paid with loan funds, such as equipment, spare parts, contracts for small structures and purchased materials.

2/ Represents costs of imported materials such as dynamite and reinforced steel previously provided with AID loan funds.

3/ Table includes approximately $70,000 of SNC cash expenditures per year for road maintenance in salary expense, fuel, spare parts and operating expenses.

The salary cost of road monitors has not been calculated since neither the number of monitors nor their compensation has been established.

Analysis of GOB Contribution

1. Engineering and Skilled Labor

The tables presented below show the personnel, man-months required and cost for the engineering and field activities of the SNC Caminos Vecinales Department. The total cost includes the Patriotic and Christmas Bonuses, social benefits, food allowances, travel, per diem, and expected salary increases during the Project-s life (Dec. 1980):

Position	ENGINEERING No.	Total Man-Month	Cost
Department Head	1	48	$ 28,800
Inspector Engineer	1	48	24,000
Regional Engineers	4	192	78,336
Transit men	4	170	29,750
Level men	4	170	25,500
Rod men	12	510	53,550
Draftsmen	4	170	25,500
Soil and Lab. Tech.	4	14	2,800
		1,322	268,236
Estimated salary increase (10%)			26,824
Social Benefits (40%)			106,890
Food allowance (1226x45)			55,170
Transportation and per diem			15,000
			$472,120

SKILLED LABOR

Position	No.	Total Man-Month	Cost
Foremen	14	560	$ 84,000
Masons	15	600	63,000
Mechanics	4	160	26,240
Mech. Assistants	4	160	16,800
Shop mechanics	3	120	19,680
Operators	32	1,280	209,920
Operators Assistants	16	640	67,200
Drivers	72	2,880	472,320
Compressor Operators	12	480	72,000
Drillers	36	1,440	187,200
Technicians	2	80	16,000
			1,234,360
Estimated Salary Increase (10%)			123,436
Social benefits (40%)			493,709
Food allowance (8,320x 45/mo)			374,400
		Total	$ 2,225,905

2) Support Costs

The support cost consists of labor and funds for operating expenses for SNC. Below are schedules detailing these costs.

SUPPORT COSTS
LABOR

Position	No.	Total Man-Month	Cost
Economist	1	48	$ 21,600
Secretary	1	48	8,640
Camp employees	4	160	16,800
Watchmen	7	280	24,640
			71,680
Estimated Salary Increase (10%)			7,168
Social benefits (40%)			28,652
Food allowance (440x45)			19,800
			$ 127,300

OPERATING EXPENSES

EXPENSE	COST
Rent	$ 8,000
Telephone and cables	5,000
Printing	4,000
Office Supplies	10,000
General Supplies	39,000
Miscellaneous charges	9,000
	$ 75,000

3) Personnel SNDC and MACAG

SNDC will hire two Community Development Investigators to fulfill its responsibilities under the Project. These Investigators will be employed for a period of three years at an estimated cost of $40,000. This figure includes all salaries, benefits and travel - per diem expenses.

The MACAG will receive $20,000 from the GOB to perform its duties under this loan. No additional staff will be hired.

4) Materials

The GOB contribution in materials will consist of crushed rock shadow priced at $2.00 per cubic meter at source. This material will be obtained from Government quarries and is valued at $320,000.

5) Fuel, Oil and Lubricants

The GOB will be responsible for supplying the fuel, oil and lubricants needed for transportation and equipment operation.

ROADS CURRENTLY UNDER CONSTRUCTION

Roads	Kms.	Constructed by:
La Paz-El Alto	11	Contractor
Tomatas-Padcaya	54	Contractor
Bella Vista-Punto LL	80	SNC
Rio Grande-San Julián	72	SNC
Icla-Azurduy	134	SNC
Rio Caine-Anzaldo	49	SNC
Asunto-San José	22	Contractor
Vallegrande-Ipita	40	SNC
Monteagudo-Huacareta	90	SNC
San Ignacio-San Borja	150	SNC
Charazani-Apolo	180	SNC
Asphalt Paving (7 sub-projects)	220	Contractor

ROAD CONSTRUCTION PROPOSED FOR THE NEXT 5 YEARS

Road	Kms.	To be constructed by:
Quillacollo-Confital	105	Contractor
La Paz-Cotapata	44	Contractor
Punto LL-Puerto Salinas y Ramales	183	SNC
Patacamaya-Tambo-Quemado	190	Contractor
Chimoré-Yapacaní	160	Contractor
Rio Seco-Desaguadero	100	Contractor
Confital-Oruro	90	Contractor
Santa Cruz-Corumbá	670	Contractor
Cota Pata-Santa Bárbara	36	Contractor
Sucre-Potosí-Tarija	550	Contractor

ACCESS ROADS CONSTRUCTED BY SNC WITH COMMUNITY LABOR

1963 to 1974

La Paz Department

Caranavi-Bolinda-Elevación Tajlihui	40 kms.
Km. 4 - Alto Beni-Bolinda	6 kms.
Suapi-Quilo-Santa Rc a	30 kms.
Taipiplaya-Los Andes	15 kms.
Taipiplaya-Villa Victoria	15 kms.
Taipiplaya-Ingavi	8 kms.
Km. 7 - Taipiplaya-Tupac Katari	7 kms.
Santa Ana-Alto San Silverio	7 kms.
Cr. Rt. 3 - Exaltación	10 kms.
Iquico-Lambate	12 kms.
Quilaxi-Tarija	5 kms.
Ocobaya-Chicaloma-Planta Eléctrica	17 kms.
Pahuata-Nogalani-Tablería	15 kms.
Huancané-Rio Blanco	15 kms.
Totora-Mercedes-Santa Rosa	15 kms.
Mercedes-Totora Grande	6 kms.
Charoplaya-Callisaya-El Carmen	14 kms.
Puente Peri-Chovacollo	3 kms.
Coripata-Marquirivi	20 kms.
	260 kms.

Chuquisaca Department

Icla-Tarvita	134 kms.
Monteagudo-Huacareta	84 kms.
	218 kms.

Potosí Department

Cotanasa-Canchas Blancas	45 kms.
Turuchipa-Checchi	25 kms.
	70 kms.
TOTAL	548 kms.

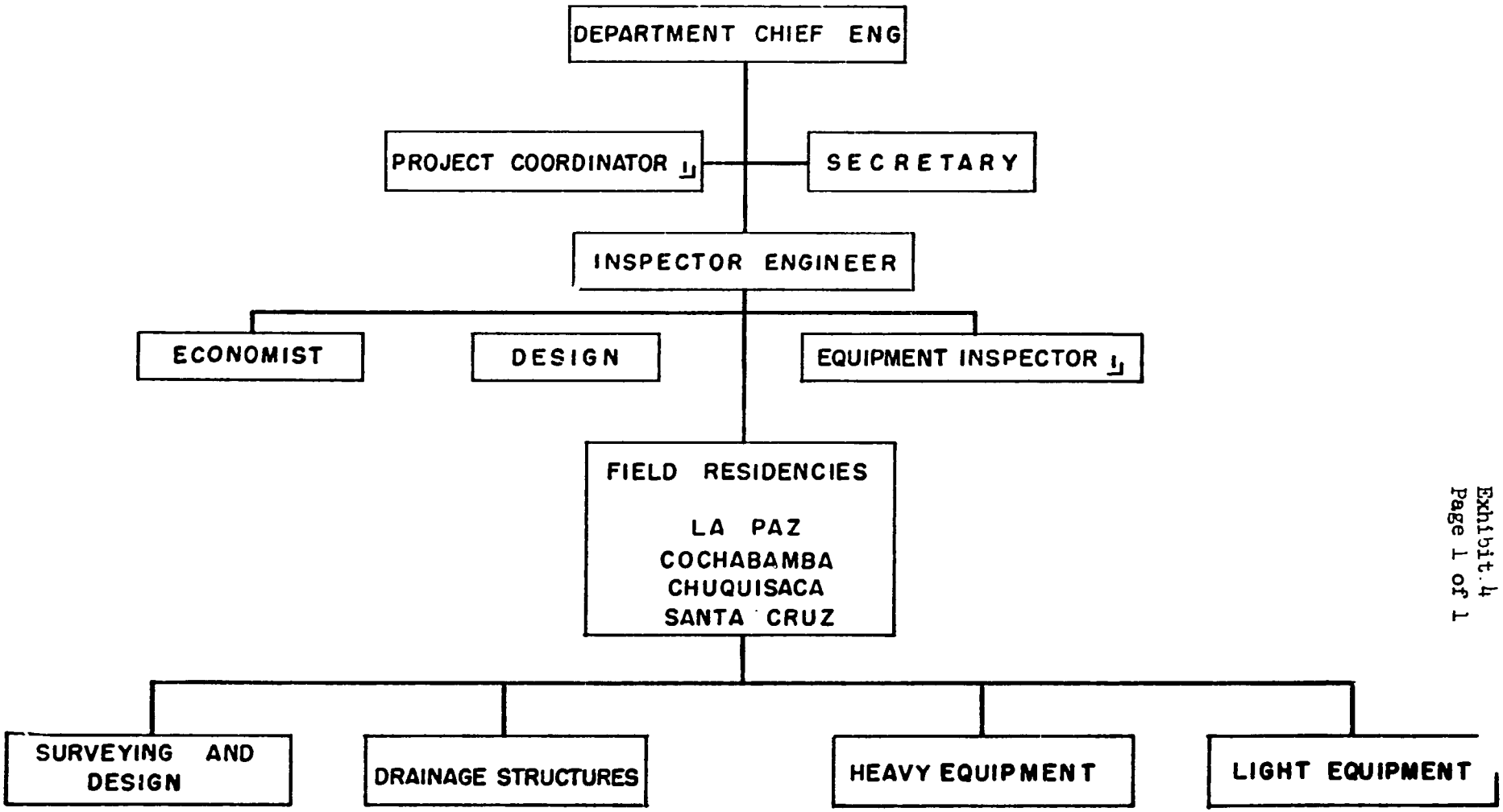
PROPOSED LIST OF CAMINOS VECINALES PERSONNEL

Below is a tentative list of personnel who will staff this Department in the Main Office in La Paz and the various District offices. All of these employees will be new hires or people promoted within SNC. Promotions or transfers into the new Department will be necessary since some experienced employees will be needed.

CAMINOS VECINALES PERSONNEL

Position	Main Office	La Paz	Cochabamba	Chuquisaca	Santa Cruz	Total
Department Head	1	-	-	-	-	1
Inspector Eng.	1	-	-	-	-	1
Economist	1	-	-	-	-	1
Technician	2	-	-	-	-	2
Secretary	1	-	-	-	-	1
Resident Eng.	-	1	1	1	1	4
Transit man	-	1	1	1	1	4
Level man	-	1	1	1	1	4
Rod man	-	3	3	3	3	12
Draftman	-	1	1	1	1	4
Soil tester	-	1	1	1	1	4
Equip. operator	-	10	12	6	6	34
Assistant Op.	-	4	6	3	3	16
Driver	3	17	23	13	16	72
Compressor Op.	-	4	4	2	2	12
Driller	-	12	12	6	6	36
Foreman	-	4	6	2	2	14
Camp employee	-	1	1	1	1	4
Watchman	-	2	3	1	1	7
Mason	-	3	6	4	2	15
Mechanic	-	1	1	1	1	4
Assistant mech.	-	1	1	1	1	4
Shop mech.	-	1	1	1	-	3
	9	68	84	49	49	259

ORGANIZATION OF CAMINOS VECINALES DEPARTMENT



1/ PAID WITH LOAN FUNDS

SNDC ORGANIZATION

The following shows the positions currently in existence at the Main Office of SNDC in La Paz and the number of professional employees:

Department	No. of Employees
Director's Office	4
Audit Department	3
Legal Department	2
Planning Department	3
Public Relations Department	2
National Operations Department	5
Administrative Department	54
Community Projects Department	55
	128

A reorganization of SNDC is planned for the coming year which should reduce Main Office personnel to 111.

There are eight regional offices within SNDC employing a total of 202 people in Oruro, Sucre, Potosí, Tarija, Cochabamba, Montero, Huarina and Patacamaya. Zonal offices are currently located in Caranavi, Sacaca, Tupiza, Camiri, Villa Tunari, Vallegrande, Trinidad and Riberalta with 107 workers.

Due to a planned increase in activities in 1976, SNDC will increase the number of zonal offices and convert some of the present regional offices into zonal offices as shown below:

Regional Offices	LA PAZ	ORURO	COCHABAMBA	SUCRE
Zonal Offices	Huarina Pillapi Caranavi Trinidad Riberalta Cobija	Patacamaya Challapata Sacaca Llica	Paracaya Villa Tunari Valle Grande Montero	Padilla Potosí Tarija Tupiza Camiri

SNDC PARTICIPATION IN SUPPORT OF OTHER AID PROJECTS

A brief description of NCDS' roles and the personnel required in support of other AID projects is provided below:

(1) Sub-Tropical Lands

Assist in cooperative and community promotion in the Chane-Piray area during the initial phase of the project and in the latter stages of the project in the San Julian area. To undertake this activity, two Cooperative Credit technicians will be assigned: one to the San Pedro Agriculture Service Center beginning in late 1976 and another in the San Julián area beginning in 1978.

(2) Agriculture Sector I

Assist in the organizational and credit activities in the project by (i) organizing interested communities so that a more efficient extension program can be developed, and (ii) participating as "community spokesman" when credit applications are reviewed on a once monthly basis. Since these activities are part of the normal routine of the NCDS supervisores and only occasional cooperation is required, no additional technicians are required in support of the project.

(3) Rural Education I

Promote and assist rural communities in improving their present school facility, supporting shops, and teachers' housing. Since this is a traditional NCDS activity and most of the assistance will be in communities which have received NCDS assistance in the construction of their present school, it is contemplated that limited promotion will be required and that only one new professional is to be hired. He will prepare the engineering plans for each construction activity.

(4) Small Farmer Organizations

In addition to the above supporting activities, the NCDS is the executing agency for a $7.5 million loan which will develop viable zonal cooperative centrals and affiliated small farmer organizations as well as assist rural community groups in developing small enterprises.

OFFICE & MAINTENANCE PERSONNEL

SERVICIO NACIONAL DE CAMINOS

CENTRAL OFFICE

Financing Department

1 Chief of Department
1 Secretary
1 Assistant

Cash and Budget

1 Cashier
1 Assistant Cashier
1 Budget Supervisor
1 Budget Assistant
1 Budget Control
1 Assistant Budget

Customs

1 Chief of Division
1 Custom Clearance Clerk
1 Custom Dispatcher
2 Assistants
1 Secretary

Collecting

1 Chief of Division
1 National Inspector of Vehicles
1 Statistics Controler
1 Assistant
1 Secretary
1 Janitor-Messenger

Administrative Department

1 Chief of Department
1 Deputy Chief of Department
1 Secretary

Inventory

1 Chief of Division
5 Inventory Clerks
1 Secretary

Medical and Social Service

1 National Physician Chief
1 Chief of Surgery
1 Social-Work clerk
1 Pharmacist
1 Pharmacist Assistant
2 Nurses

Personnel

1 Chief of Division
1 Assistant-Personnel
2 Clerks

General Services

1 Chief of Division
1 Warehouse Supervisor
1 Mailing Supervisor
7 Assistants
3 Messengers
7 Watch men
1 Warehouse laborer

Planning and Programming

1 Chief of Department
1 Assistant of Department
2 Design Engineers
2 Inventory roads clerks

2 Assistants-Warehouse
1 Messenger
1 Watchman

Maintenance

4 Resident Engineers
4 Assistants-Resident

DISTRICT OF TARIJA

Administration

1 District Engineer
1 Assistant District Engineer
1 Administrative Chief
1 Secretary
1 Accountant
1 Personnel Supervisor
3 Bookkeepers
1 Warehouse Supervisor
3 Payers
2 Assistants-Accounting
2 Assistants-Warehouse
1 Janitor

Maintenance

5 Resident Engineers
4 Assistants-Resident

DISTRICT OF COCHABAMBA

Administration

1 District Engineer
1 Assistant District Engineer
1 Secretary
1 Administrative Chief
1 Accountant
1 Personnel Supervisor
2 Bookkeepers
2 Payers
1 Warehouse Supervisor
2 Assistants-Warehouse
2 Accounting Assistants
1 Messenger
1 Watchman
1 Janitor
1 Nurse
1 Secretary of Projects

Maintenance

4 Resident Engineers
5 Assistants to Residents

DISTRICT OF SANTA CRUZ

Administration

1 District Engineer
1 Assistant District Engineer
1 Administrative Chief
1 Accountant
1 Personnel Supervisor
1 Warehouse Supervisor
3 Bookkeepers
2 Payers
2 Assistants-Warehouse
2 Assistants-Accounting
1 Secretary
1 Janitor
2 Watchmen
1 Custom Dispatcher
1 Assistant Custom Dispatcher

Maintenance

5 Resident Engineers
4 Assistants-Resident

DISTRICT OF ORURO

Administration

1 District Engineer
1 Assistance District Engineer
1 Administrative Chief
1 Accountant
1 Personnel Supervisor
1 Warehouse Supervisor
2 Bookkeepers
3 Payers
1 Secretary
1 Assistant-Accounting
2 Assistants-Warehouse
1 Messenger
1 Watchman

Maintenance

6 Resident Engineers
4 Assistants to Resident

DISTRICT OF POTOSI

Administration

1 District Engineer
1 Assistant District Engineer
1 Administrative Chief
1 Accountant
1 Secretary
1 Personnel Supervisor
1 Warehouse Supervisor
2 Bookkeepers
1 Payer
1 Assistant-Warehouse
3 Accounting Assistants
1 Kardex Clerk
2 Janitors
1 Messenger

Maintenance

4 Resident Engineers
4 Assistant Resident

DISTRICT OF TUPIZA

Administration

1 District Engineer
1 Administrative Chief
1 Accountant
1 Bookkeeper
1 Warehouse Supervisor
1 Payer
1 Personnel Supervisor
2 Accounting Assistants
1 Warehouse Assistant
1 Secretary
2 Watchmen

Maintenance

1 Resident Engineer
2 Assistants-Resident

DISTRICT OF BENI

Administration

1 District Engineer
1 Administrative Chief
1 Accountant
1 Bookkeeper
2 Personnel Clerks
1 Payer
1 Warehouse Supervisor
1 Assistant Warehouse
1 Assistant Accounting
1 Secretary
1 Radio Operator
1 Watchman-Messenger
1 Watchman

Maintenance

2 Resident Engineers

RELACION DE DEPARTAMENTO Y JEFES DEL S.N.C.

	DEPARTAMENTOS	NOMBRE DEL JEFE	FORMACION PROFESIONAL	TIEMPO DE SERVICIO
1.	Director S.N.C.	Alfonso Balderrama M.	Ing. Civil	11 años
2.	Jefe de Operaciones	Eduardo Iraola Torres	Ing. Civil	19 años
3.	Planeamiento y Programación	Félix Leyton Leaño	Ing. Civil	12 años
4.	Estudios y Construcciones	Max Jeréz Leaño	Ing. Civil	13 años
5.	Mantenimiento y Mejoramiento	José Luis Belmonte A.	Ing. Civil	18 años
6.	Puentes y Estructuras	Alfonso Subieta O.	Ing. Civil	14 años
7.	Equipos	Raúl Rivero Games	Ing. Mećanico	10 años
8.	Finanzas	Hugo Drackic Rico	Lic. Economía	8 años
9.	Administrativo (1)	Augusto Palomo Bascopé	----	1 año

La Paz, Octubre de 1975

(1) Under Secretary in the Ministry of Transportation for two years. Before this job he was an employee of S.N.C.